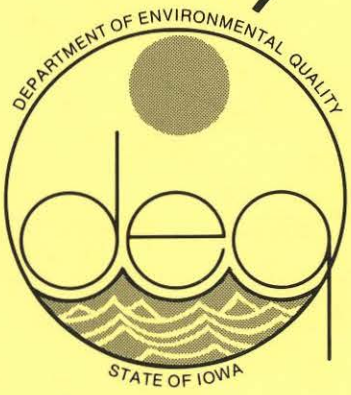
# THE AIR QUALITY DISPLAY MODEL ANALYSIS FOR SUSPENDED PARTICULATES IN MUSCATINE, IOWA




**IOWA DEPARTMENT OF ENVIRONMENTAL QUALITY**

AIR QUALITY MANAGEMENT DIVISION

## Abstract

The Iowa Department of Environmental Quality (DEQ) is currently examining possible revisions of the State Implementation Plan. These air pollution control srategy revisions are being evaluated so that the National Ambient Air Quality Standards can eventually be attained and maintained in all parts of Iowa as required by the Clean Air Act Amendments of 1977. To accomplish this, it is necessary to analyze current air quality attainment problems.

To examine these current air quality attainment problems, a dispersion model is used. The dispersion model is a computer program that predicts what the ambient air quality will be at a certain point within an air basin. The Air Quality Display Model (AQDM) is the major tool DEQ used to model each air basin. AQDM is a computer model that combines point source emissions (industrial plants), area source emissions (residential heating, fugitive dust, solid waste disposal, transportation, etc.) and meteorological factors (wind speed, wind direction, average temperature, pressure, and mixing height) over a specified area to predict the annual distribution of pollutants for that area. From the results obtained by using AQDM, a reliable estimation of source contribution is found.

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## Introduction

Total suspended particulate (TSP) is one of the six pollutants for which the federal EPA has declared national air quality standards for the protection of human health and welfare. A set of strategies to control TSP emissions, and thereby reduce ambient concentrations of this pollutant to acceptable levels, was developed by the Iowa Air Pollution Control Commission in 1971 and 1972. These strategies became part of a federally approved State Implementation Plan on May 31, 1972 (40 CFR, Part 52). Since that time most air pollution sources have reached compliance with State particulate emission standards, yet air monitoring has shown portions of Iowa are still plagued with unacceptably high TSP concentrations. The Clean Air Act Amendments of 1977 required each state to identify those areas with unacceptably high TSP concentrations and devise a control strategy to reduce these high concentrations.

The purpose of this analysis is to explore the causes of these high TSP concentrations to aid in the future development of necessary control strategies which will lead to reducing TSP to an acceptable level.

## County Statistics

Muscatine County is located in the rolling hills of eastern Iowa. The eastern section of Muscatine County is part of a long bluff line rising over one hundred feet above the Mississippi River. The City of Muscatine is the major urban center and borders the Mississippi River in the east-central section of the county. (See Figure 1) The 1970 population for the Muscatine metropolitan area was 22,405; the 1970 population for Muscatine County was 37,181. Major industrial processes in Muscatine County consist of tire manufacturing, chemical production, grain processing and transferring, mineral product manufacturing, and electri-

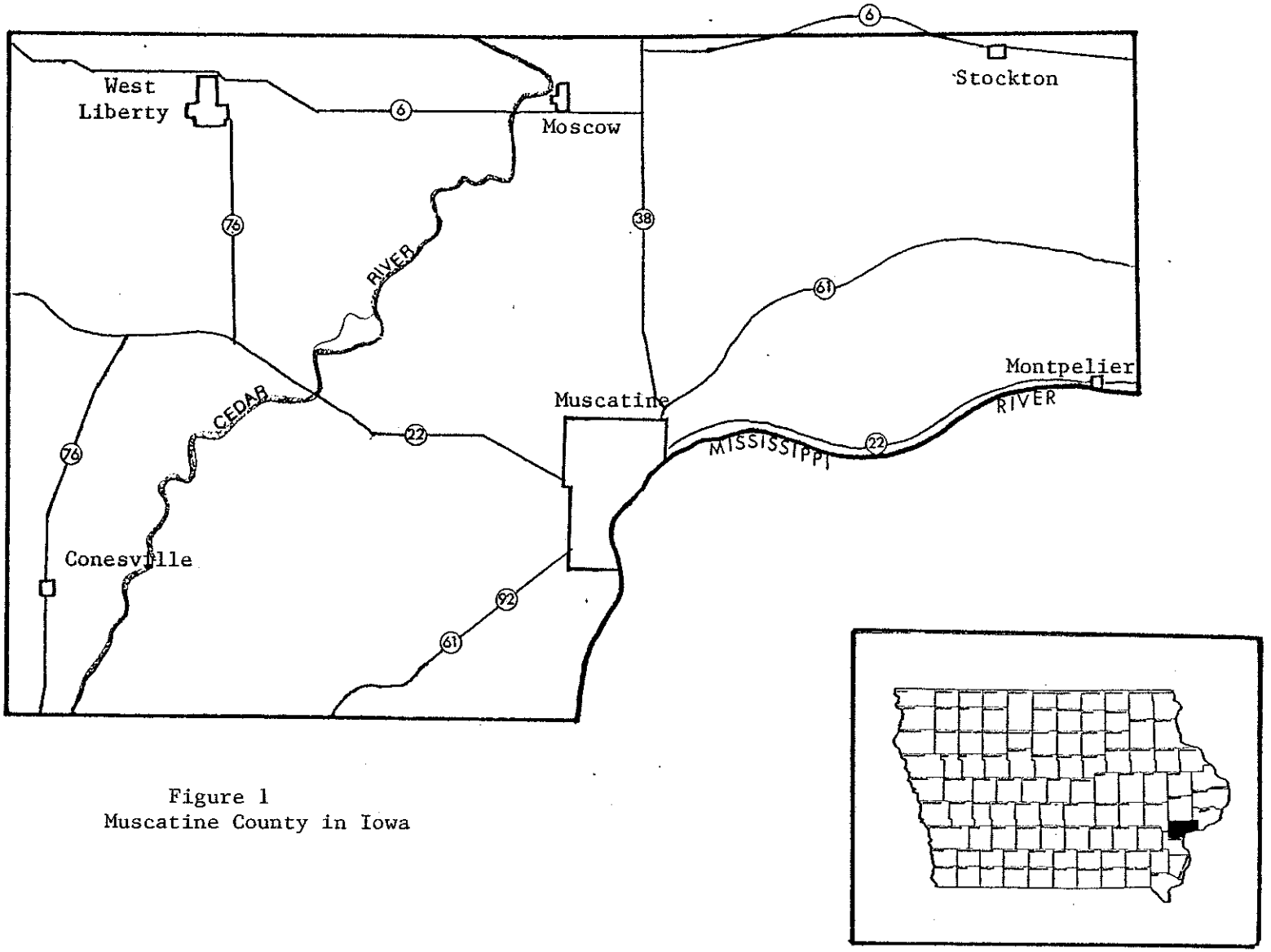



Figure 1
Muscatine County in Iowa

city generation. Major sources of fugitive dust and fugitive emissions include grain transferring, construction, agricultural tilling, and roads (both paved and unpaved).

Muscatine County is situated in a temperate climate in the middle of a large land mass. The area is largely influenced by pressure systems moving in a general west-east direction. The winds are dominant from the northwest and the south to southeast, except for the area east of the bluffs, which may tend to have winds channeled in directions paralleling the bluff. The mean annual temperature is 50 degrees Fahrenheit, the mean annual precipitaton is 34 inches. Neutral atmospheric stability is dominant for this area, with slightly unstable and stable conditions occurring less frequently.

Background

Because of large-scale natural suspended particulate emissions (such as volcanoes and dust storms) and large-scale man-made suspended particulate sources (such as agricultural activities) which cannot be accurately modeled, a natural background estimate must be developed for Iowa to include in any modeling.

To develop a numeric value for background, extensive monitoring of an isolated rural area must be conducted. The background of suspended particulates in Iowa was estimated from monitoring conducted from 1959 to 1965 at Backbone State Park in northeast Iowa. This site appears to be the most isolated area monitored in the State and is located away from any localized agricultural and urban sources. However, because of the large amount of agricultural activity in the State, an additional contribution from soil erosion, tilling, and travel on unpaved surfaces is inevitable and thus a true background measurement not influenced by any man-made sources is unlikely. Therefore the background recorded at Backbone

State Park is expected to include not only a natural worldwide background but a local and statewide background. To estimate the contribution of all sources to the background site, a study of rural sources was conducted.

The background figure monitored at Backbone State Park averaged 44 micrograms per cubic meter annual arithmetic mean. An estimated breakdown of sources accounting for this monitored value is shown in Table 1 below.

TABLE 1

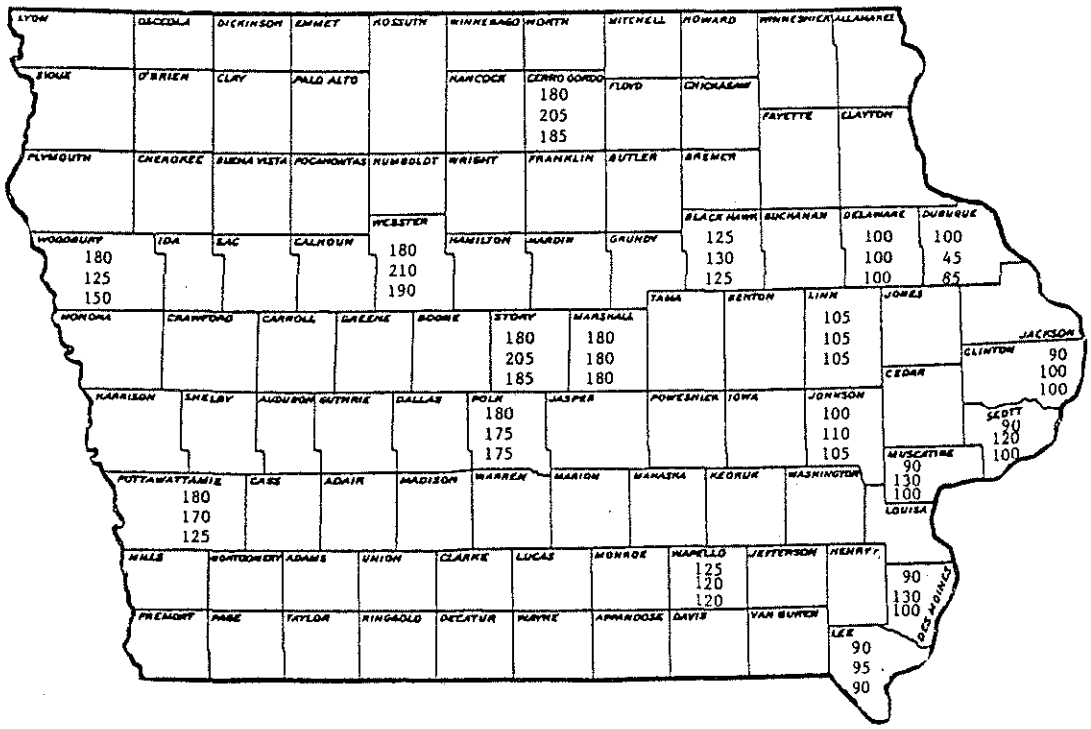
Source Contributions to the Recorded
Background level at Backbone State Park
(Values shown are in micrograms per cubic meter [$ug/m^3$])

| | |
|---|---|
| Worldwide Concentration | 15 $ug/m^3$ |
| Continental Concentration | 10 $ug/m^3$ |
| Unpaved Roads | 6 $ug/m^3$ |
| Agriculture (soil erosion) | 13 $ug/m^3$ |
| Total Background | 44 $ug/m^3$ |

The worldwide and continental values were obtained from studies conducted by GCA Corporation for DEQ[1]. This natural background that is not influenced by man is approximately 25 $ug/m^3$. The unpaved road estimate of 6 $ug/m^3$ was established by computer modeling of all rural unpaved roads in a five county area. The remaining 13 $ug/m^3$ was assumed to be from agricultural processes such as tilling and soil erosion.

Since the contribution from agricultural processes could easily be larger or smaller in other areas of the state depending on the farming practices, an investigation of these farming practices throughout the state was conducted. By comparing climatic factors, soil types, crops planted, and tilling frequencies in other areas of the state with the area around Backbone State Park, an index of soil erodibility was developed as shown in Figure 2. Using this index to increase or decrease the contribution of agricultural sources, an estimation of background throughout the State has been developed as shown in Figure 3.

Figure 2
Agricultural Index For Selected
Counties in Iowa




100 The first number represents the climatic factor for the county using the Federal Soil Conservation's climatic factors for Iowa. Deleware County is the reference county and has been given a value of 100. Numbers greater than 100 represent drier conditions while numbers less than 100 represent wetter conditions.

100 The second number represents the proportion of tilled land in soybeans or row crops. Deleware County is the reference county and has been given a value of 100. A county registering 200 would have twice the amount of land in soybeans or row crops.

100 The third number represents the agricultural index for the county. Deleware County is the reference county and has been given a value of 100. This index was based on the climatic factor, proportion of tilled land, and county size. Numbers greater than 100 represent areas of more severe wind erosion than Deleware County while numbers less than 100 represent areas of less severe soil erosion.

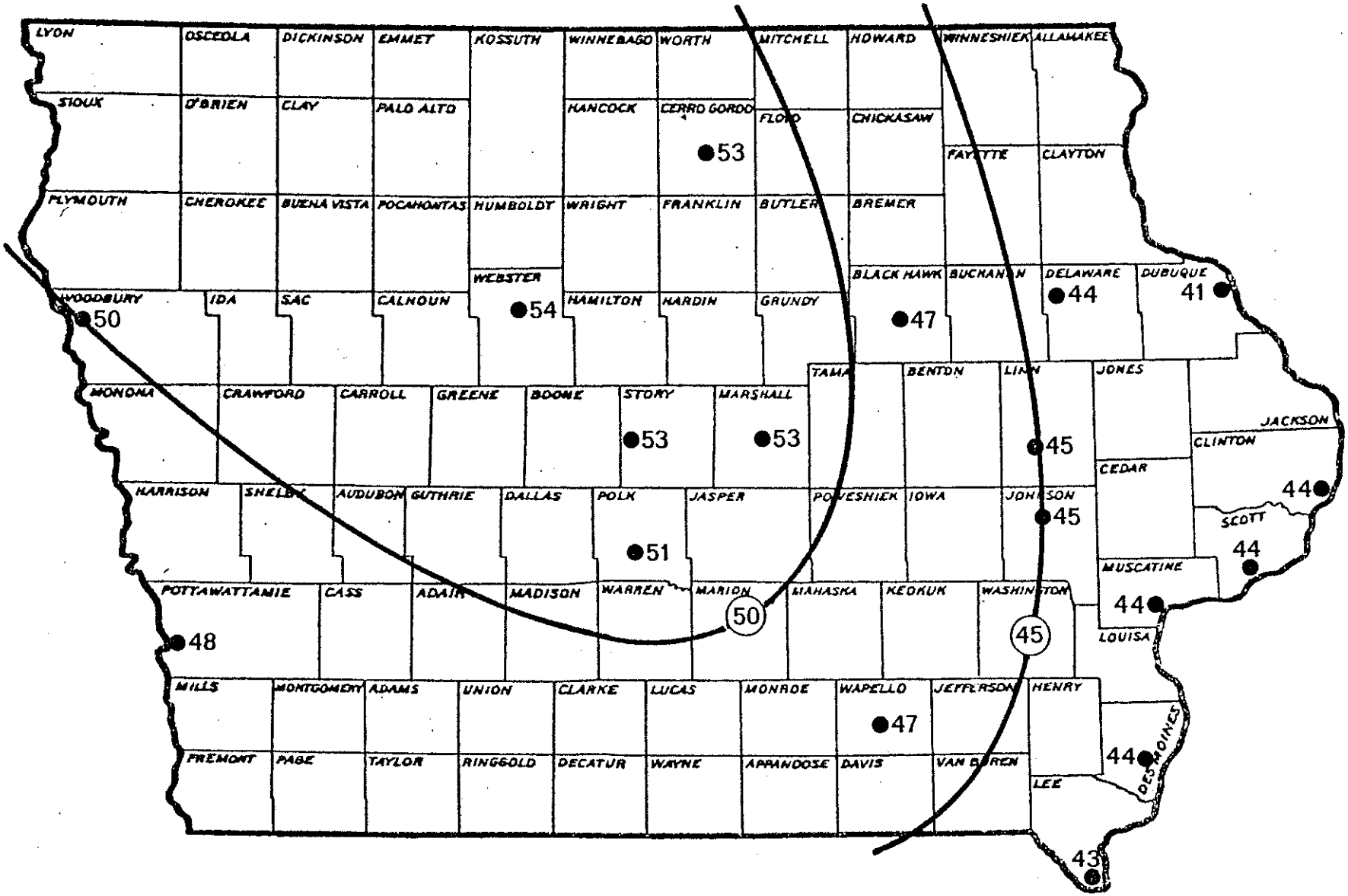



Figure 3
Estimations of Rural Background levels in Iowa
(Values shown are arithmetic means in micrograms per cubic meter)

## Air Monitoring

The most accurate measurement of suspended particulate levels in an area is obtained by monitoring the air. Air quality data for suspended particulate are obtained using the high volume sampler. The sampler draws a known quantity of ambient air through a preweighed glass fiber filter for a twenty-four-hour period once every six days. After each twenty-four-hour period the sample filter is sent to the laboratory where it is weighed again. The weight difference measured in micrograms is the amount of particulate. Combined with the volume of air that passed through the filter during the twenty-four-hour period, the sampling results are calculated and recorded as the average micrograms of particulate matter per cubic meter of air for a twenty-four-hour period. One State owned high volume sampler has been located in Muscatine since December 1975. This monitor is located on the City Hall roof at East Third and Sycamore Streets. (See Figure 4) Table 2 shows the monitored values at this site.

Monitoring for suspended particulate has also been conducted by Muscatine Municipal Power and Water Company (MMPW) since April 1977. Two monitoring sites are operating in Iowa and one in Illinois as shown in Figure 4. A summary of monitoring values for 1977 are shown in Table 3.

TABLE 2
Iowa
Air monitoring data for Muscatine

| Location | Year | Number of Samples | Maximum 24-Hour Value | 2nd Max. 24-Hour Value | Arithmetic Mean | Geometric Mean | Standard Geometric Deviation |
|---|---|---|---|---|---|---|---|
| City Hall, E. 3rd & Sycamore | 1976 | 58 | 142.0 | 131.0 | 80.7 | 74.6 | 1.52 |
| | 1977 | 60 | 204.0 | 201.0 | 72.6 | 66.4 | 1.50 |

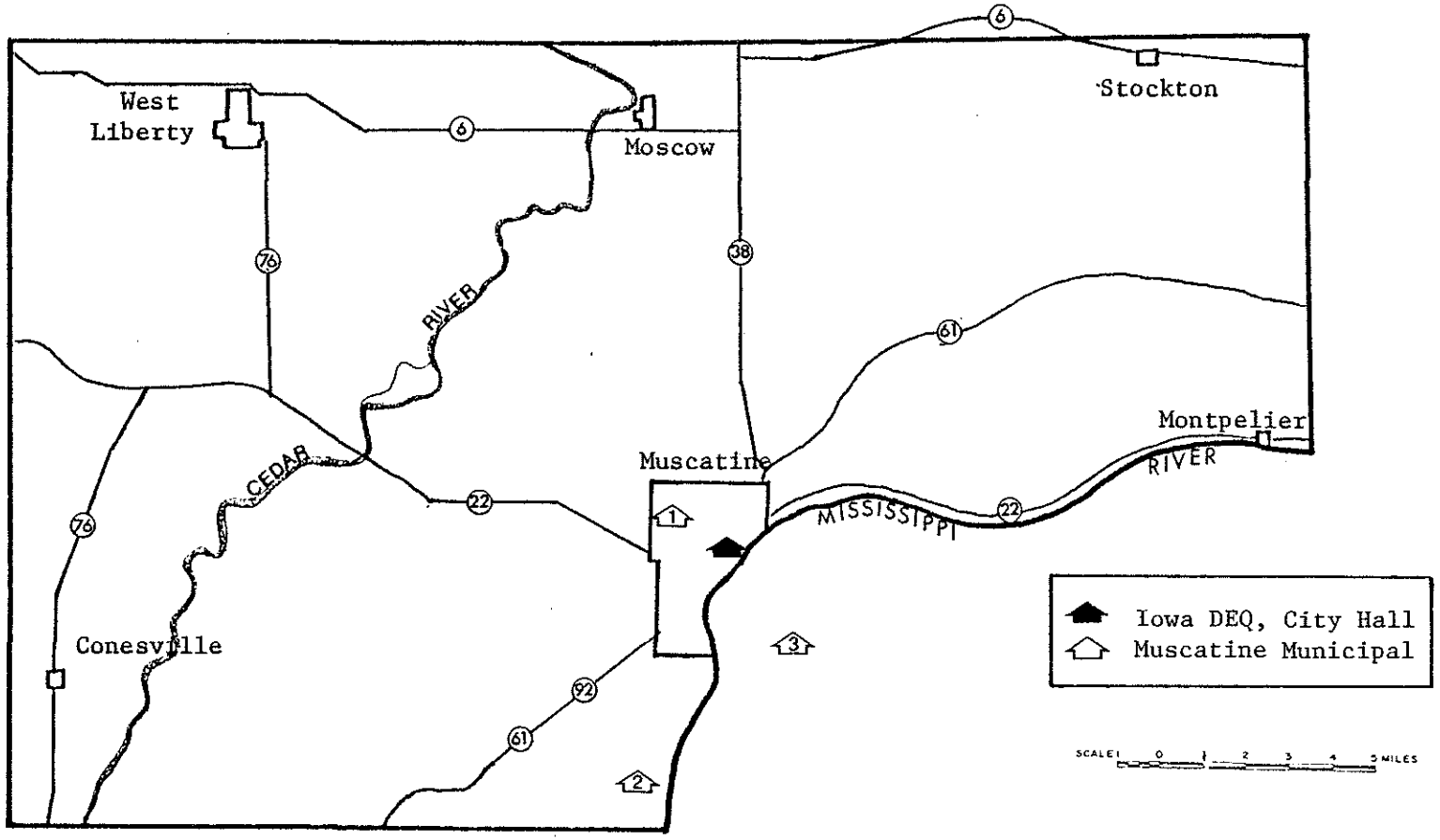



Figure 4
Location of air monitoring equipment in
Muscatine County

TABLE 3
Muscatine Power and Light Company's
Air Monitoring Data for Muscatine

| Site Location | Year | Number of Samples | Maximum 24 Hr. Value | 2nd Max. 24 Hr. Value | Arithmetic Mean | Geometric Mean | Standard Geometric Deviation |
|---|---|---|---|---|---|---|---|
| 3205 Cedar St. | 1977 | 24 | 109.1 | 90.8 | 46.9 | 41.6 | 1.64 |
| RR 5 Wiggins Road | 1977 | 33 | 118.9 | 89.7 | 49.1 | 41.8 | 1.87 |
| RR 1, Illinois | 1977 | 27 | 74.2 | 71.7 | 41.9 | 36.6 | 1.74 |

The air monitoring data are an essential tool in calibrating the computer model. The annual means that are predicted by the model are correlated with the monitoring data to estimate the accuracy of the projections. Large variances between the monitored values and the projections indicates poor correlation and revisions to the model inputs must be made. Small variances indicate good correlation and correct model inputs.

The Model (Annual Average Estimation)

A dispersion model is a compter program that predicts what the ambient air quality will be at a certain point within an air basin. The Air Quality Display Model (AQDM)[2] is the model DEQ used in each air basin. AQDM is a computer model that combines point source emissions (industrial plants), area source emissions (residential heating, fugitive dust, solid waste disposal, transportation, etc.) and meteorological factors (wind speed, wind direction, average temperature, pressure, and mixing height) over a specified area to predict the annual distribution of pollutants for that area. The annual particulate concen-

trations predicted by the model for each year are plotted as isopleths over the air basin. Five designated receptors are also broken down into specific source contribution percentages.

The computer algorithm and the program inputs reflect several assumptions. Assumptions used in the computer algorithm are:

(a) Total reflection of the pollutant plume takes place at the earth's surface.

(b) Conditions describing the plume are averaged over a time period of several minutes.

(c) All effluent gases and particulates have diameters less than 20 microns and have neutral buoyancy in the atmosphere. Zero fallout is assumed.

(d) The plume exhibits a Gaussian concentraton distribution and the spread in both directions is considered to be a function of downwind distance and atmospheric stability only.

(e) The plume is a steady-state phenomenon resulting from a constant, continuous emission.

Assumptions used in the program input are:

(a) Point source data from plant emission inventory forms, from stack tests, and from permit information are accurate and complete.

(b) Sources not reporting stack parameters were given parameters of similar sources (this was true in interstate air basins where other states occasionally were not able to provide stack parameters).

(c) Area source data from the National Emissions Data System (NEDS) are accurate and complete.

(d) Population distribution and area source emissions are directly related.

(e) Fugitive emissions from paved and unpaved roads are accurately calculated.

## Source of Suspended Particulates (Point)

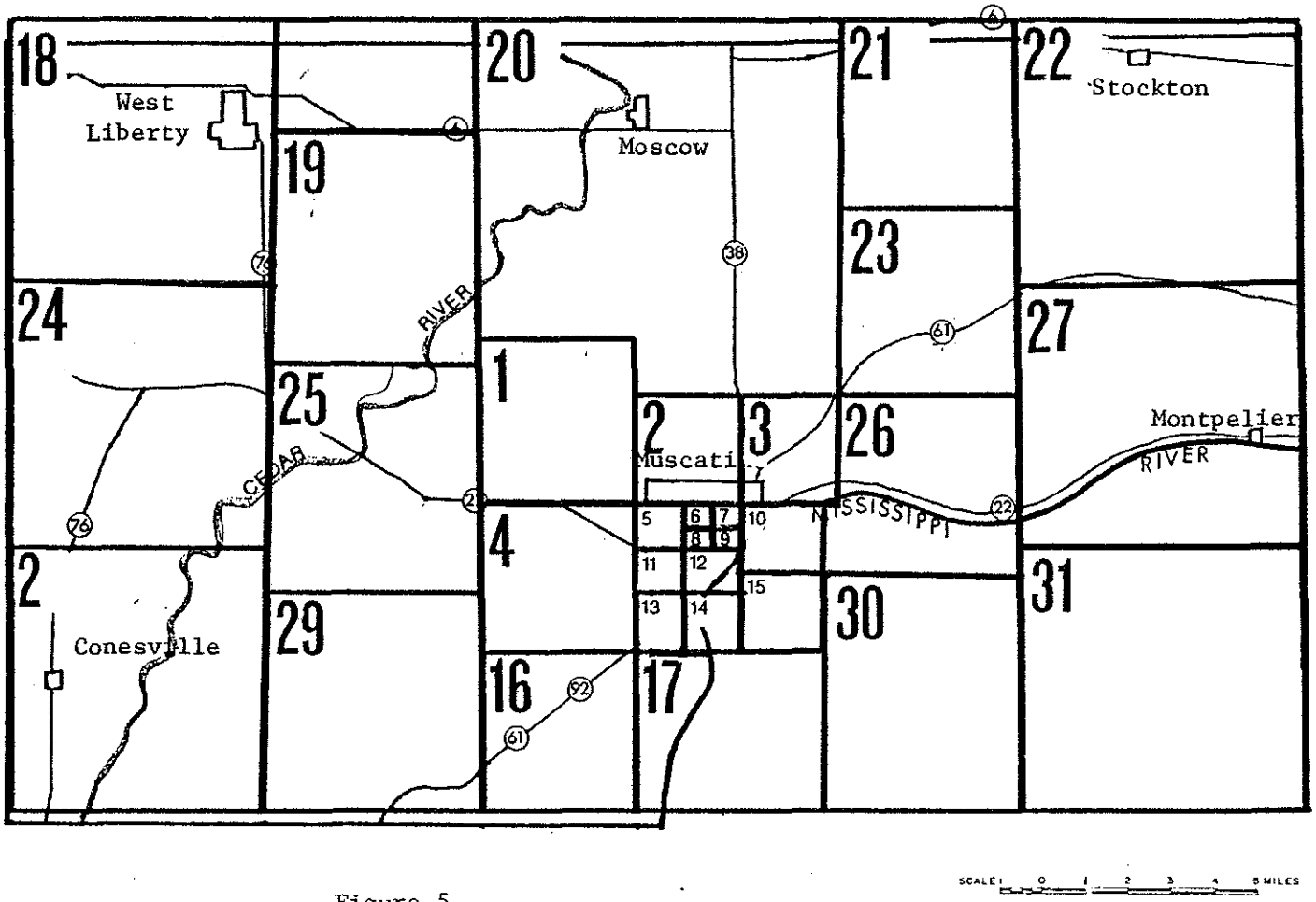
All Muscatine point sources were acquired from DEQ's current emission inventory. Stack emissions, diameters, emission velocities and temperatures were taken from values supplied by the plant operators on emission inventory forms, permit applications, or stack tests performed at the plant. Emissions for the modeled year were taken from the 1975 emission inventory and updated by permit applications, compliance schedules, or stack tests. All plant controls were assumed to be working the entire year unless breakdown or maintenance reports were submitted to the Department. The emissions during periods of emission control device breakdown or maintenance were added to the plant totals. All industrial point source estimates calculated were verified by the appropriate plant officials. Fugitive dust point sources were given plume heights of 6.0 meters. All source emissions were calculated in tons per year and divided by 365 days to obtain the necessary model input of tons per day. No consideration was given to seasonal operation or weekend shutdowns.

## Sources of Suspended Particulates (Area)

### Residential Emissions

Total residential emissions for fuel use and solid waste disposal in Muscatine County were taken from the National Emissions Data System (NEDS) estimates of area source emissions supplied by EPA. The emissions were distributed by housing population calculated from the census population for 1970 and updated from projections from the Iowa Office of Planning and Programming.[3] The 1977 Muscatine population growth was estimated at 1.056 times the 1970 census figure.

The Muscatine County census population was broken down into designated area sources in the model region as shown in Figure 5. Area housing populations were




SCALE: 0 1 2 3 4 5 MILES

Figure 5
Area Source Grid Pattern for Muscatine

divided by the total county housing population and multiplied by the county emission totals to obtain area emissions for residential fuel use and solid waste.

All housing emissions were assumed to be uniform for the county. Total particulate emissions for the modeled year obtained from NEDS were:

| | 1977 |
|---|---|
| Residential Fuel | 22 tons per year |
| Residential Solid Waste | 62 tons per year |

Commercial-Institutional Emissions

Total commercial-institutional emissions for fuel use and solid waste disposal in Muscatine County were taken from the NEDS data supplied by EPA. Ninety percent of the county emissions was assumed to be in the major urban center, while ten percent was assumed to be in the smaller cities.

All commercial-institutional building emissions were assumed to be uniform for the county. Total particulate emissions for the modeled year were:

| | 1977 |
|---|---|
| Commercial-Institutional Fuel | 44 tons per year |
| Commercial-Institutional Solid Waste | 27 tons per year |

Transportation-Motor Vehicle

Total emissions from transportation sources, excluding fugitive emissions, were taken from the NEDS data supplied by EPA. Emissions from major highway line sources and rural paved and unpaved roads were individually calculated.

Major access street and highway line source emissions were calculated by multiplying the emission factor for vehicles (0.66 grams per vehicle mile)[4] by the product of the length of the road segment and the traffic flow count. Each line source emission was assigned to the appropriate designated area and was assumed to disperse equally over the area. All car and truck emissions were assumed to be approximately the same. After all major access highway emissions were calculated, the total line source emissions assigned to each area was subtracted from the NEDS county total and distributed by the population proportion in each area.

Fugitive dust from vehicle travel on paved and unpaved roads was calculated from emission factors found in two recent reports.[5,6] Fugitive dust from unpaved roads was calculated by multiplying the emission factor (1179 grams per vehicle mile) by the product of the length of the road segment and the traffic flow count. Thirty percent of these emissions was assumed to actually become suspended. Paved road emissions were also calculated by multiplying the emission factor (11 grams per vehicle mile) by the product of the length of the road segment and the traffic flow count. These emission factors were derived from an emission formula that combines conditions of the road, vehicle speeds, and climatological factors to obtain grams of particulate per vehicle mile. Emissions from each road segment are assumed to disperse equally over the desig-
nated areas.

Total estimated particulate emissions for the modeled year were:

| | 1976 |
|---|---|
| Vehicles | 161 tons per year |
| Fugitive (paved roads) | 2530 tons per year |
| Fugitive (unpaved roads) | 15090 tons per year |

Transportation - Railroads

Total railroad fuel use emissions for railroads in Muscatine County were taken from the NEDS data supplied by EPA. Approximate track mileage was estimated for each designated area. Emissions were distributed by the proportion of track miles in each area.

Transportation - Off Highway

Off highway transportation was considered to be any fuel burning machine not operated on a road (i.e., farm tractor, lawnmowers, motorized boats, etc.). Because of the difficulty in estimating the concentration of off-highway transportation, it was assumed that the NEDS emissions were distributed equally over the entire county.

Transportation - Aircraft

The Muscatine Airport emissions were distributd as a one square kilometer area source. Emissions were based on projections from the State airport system plan.[6]

A listing of area sources and total emissions used in the model is given in Appendix A.

Model Meteorology Parameters

To accurately model the suspended particulate emission sources, detailed meterological parameters are necessary.

Meteorological wind data consists of five stability classes and sixteen wind directions. These data were not available for Muscatine, therefore wind data

from Burlington, a city relatively close to Muscatine, were chosen. The wind data from Burlington were chosen over other cities near Muscatine because of the similar river orientation.

Other necessary meteorological parameters that were obtained for Muscatine are shown below:

| | |
|---|---|
| Average daily mixing depth: | 1180 meters |
| Average ambient temperature | 284 degrees Kelvin (11 degrees Celsius) |
| Average ambient pressure | 992 millibars |

Results

A grid area of 13 kilometers by 17 kilometers was set up around Muscatine with receptors placed at one kilometer intervals as shown in Figure 6. Twelve additional receptors located throughout the county were also included in the total receptor count.

Expected concentrations at each receptor are given in Appendix B. Graphical displays of these results are illustrated in Figure 7 for Muscatine County and Figure 8 for the City of Muscatine. Each line represents an isopleth of suspended particulate concentration as an annual arithmetic mean. The highest concentration expected was 229 micrograms per cubic meter at receptor 129.

To estimate the impact of each source on a receptor, a special audit was requested for receptors 126, 128, 130, 222, and 233. Results for each source are given in Appendix B while a summary is shown in Table 4.

To estimate the accuracy of the modeling results, a comparison of expected concentrations and monitoring data is shown in Table 5. This comparison appears to be relatively close for the limited number of monitor sites.

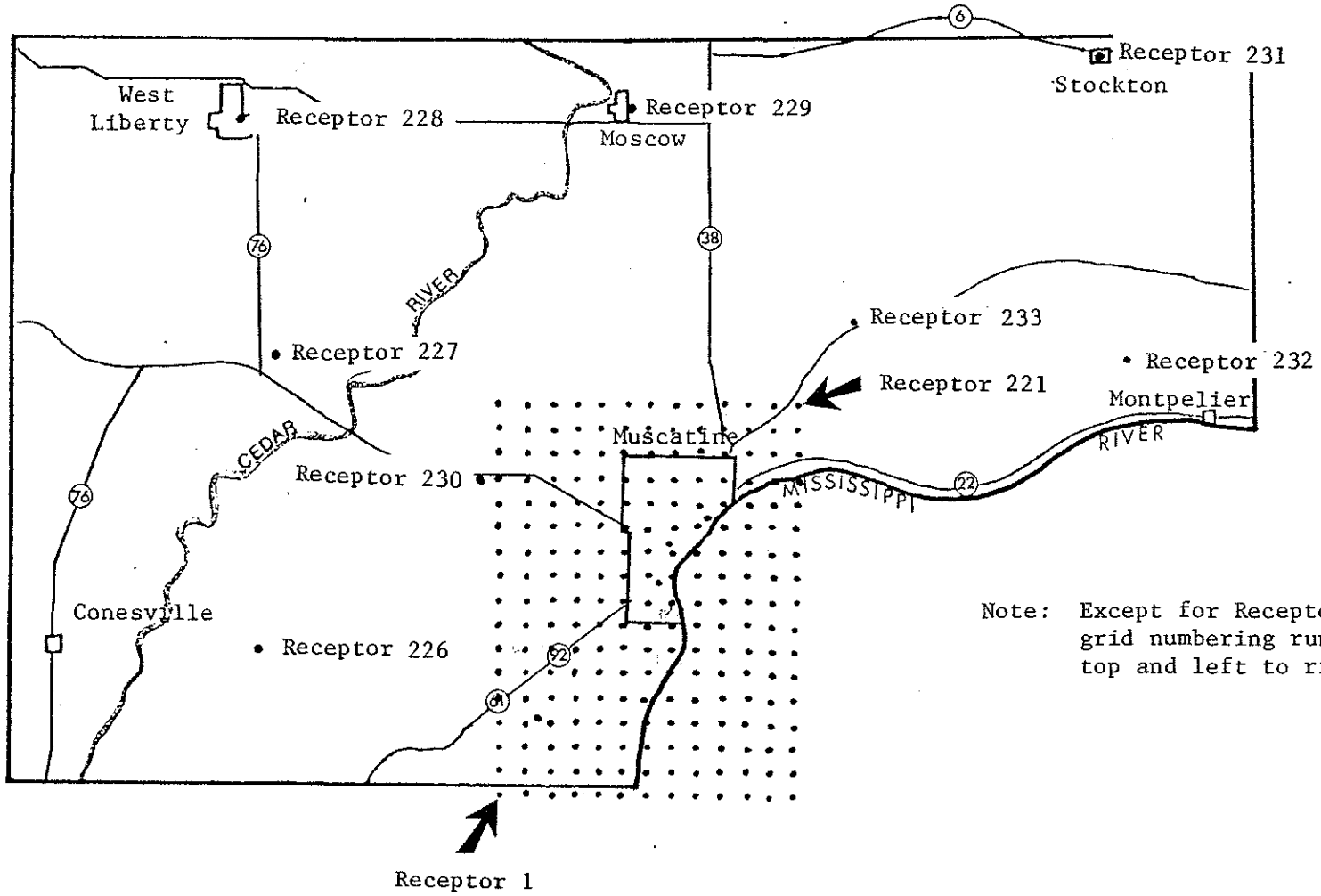
TABLE 5

Comparison of Air Monitoring Data

with Projected Concentrations

| Monitor Location | 1977 Arithmetic Mean | Projected Concentration |
|---|---|---|
| City Hall | 72 | 76 |
| 3205 Cedar St. | 47* | 60 |
| R.R. 5, Wiggins Rd. | 49* | 55 |
| R. R. 1, Illinois | 42* | 58 |

* Data recorded from June 1977 to December 1977 - Do not use as annual statistics representative of air quality because four valid quarters are not available.




Note: Except for Receptors 222–233, grid numbering runs bottom to top and left to right.

Figure 6
Receptor Locations for Muscatine
AQDM Model

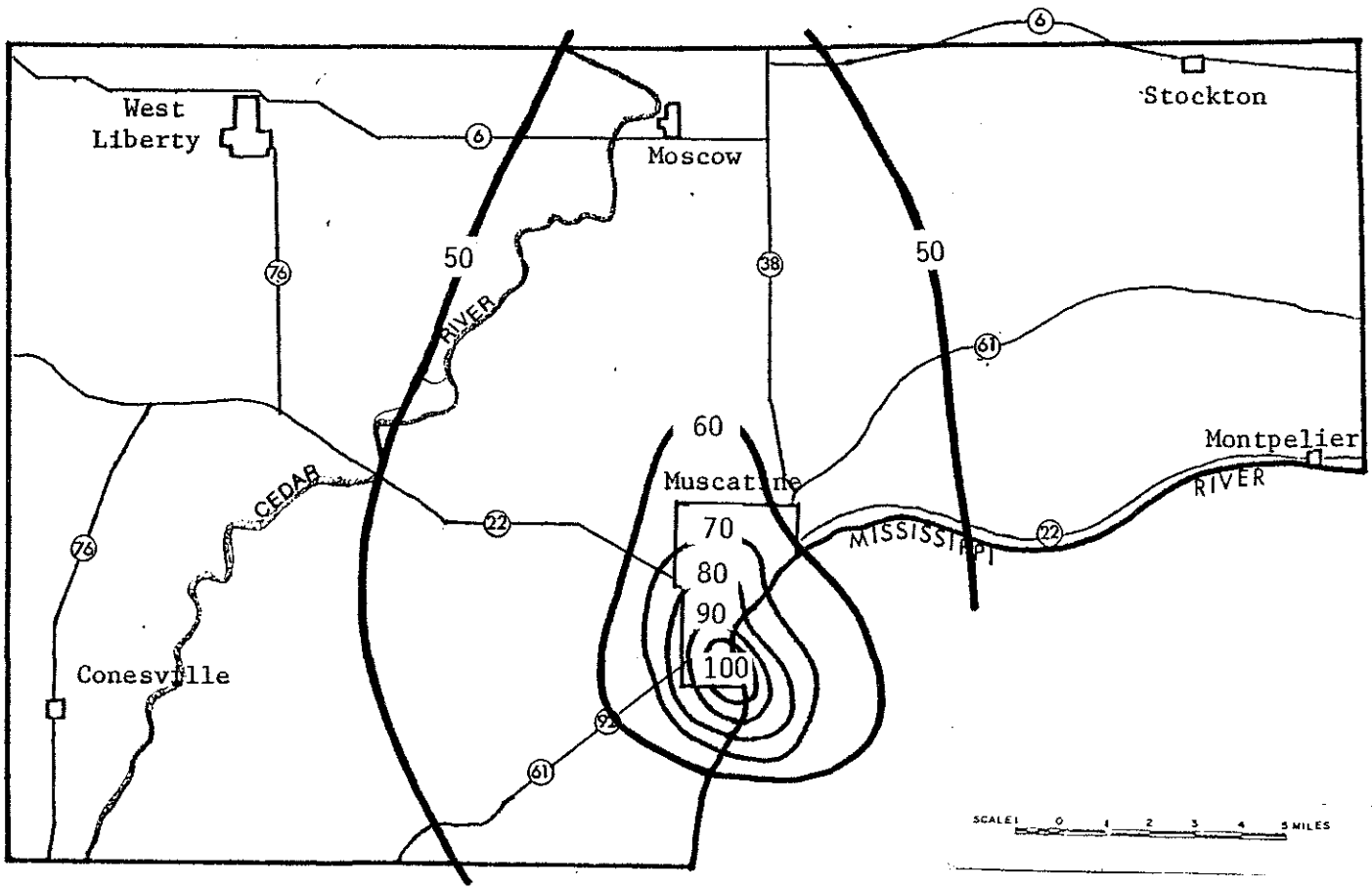



Figure 7
Muscatine County
1977 Suspended Particulate Isopleth Map
(values shown are arithmetic means in micrograms per cubic meter)

Figure 8
Suspended Particulate Isopleth Map for Muscatine
(values shown are arithmetic means in micrograms per cubic meter)

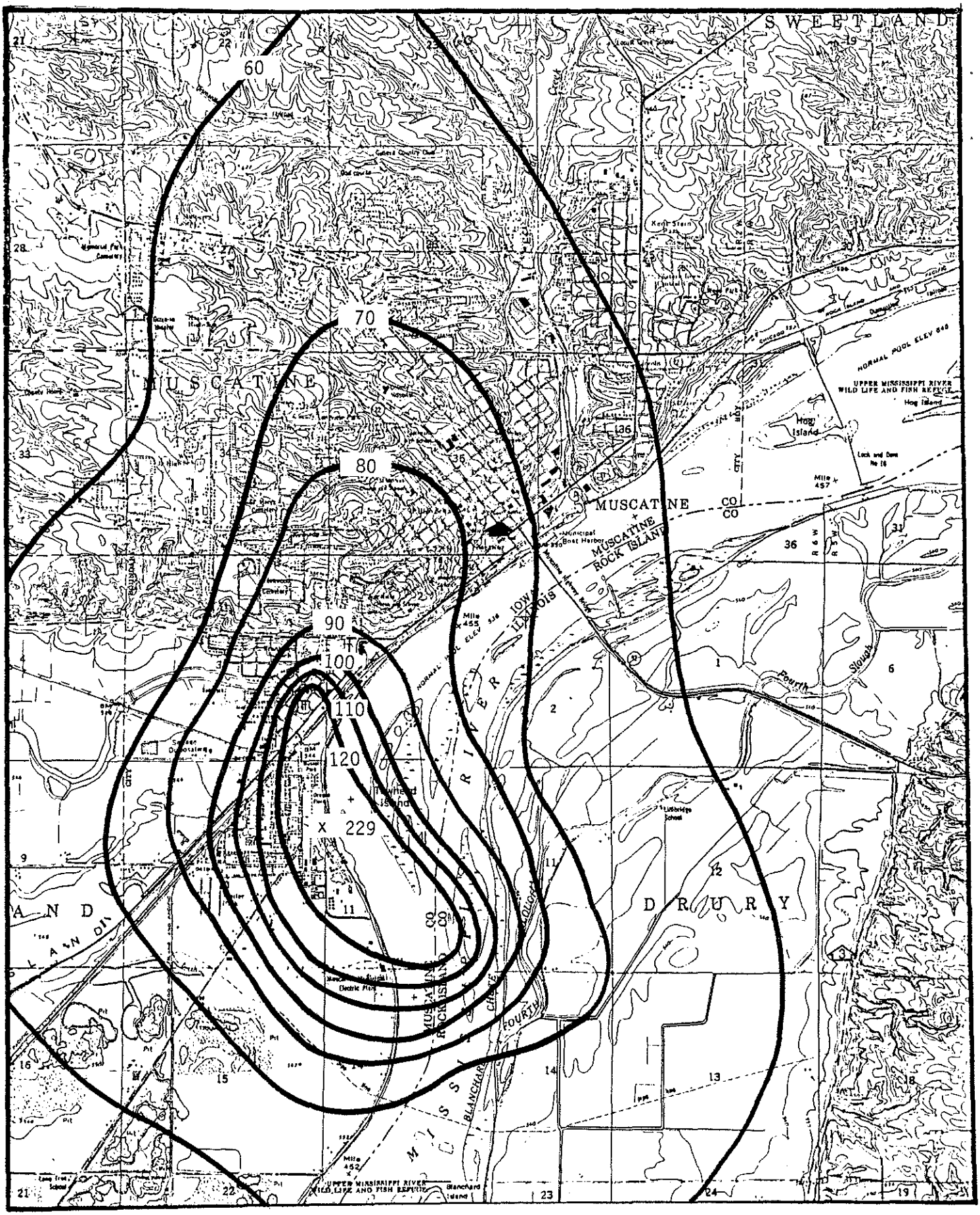


TABLE 4
Source Contributions to Five
Selected Receptors
(values shown are in micrograms per cubic meter)

| Source | Receptor 126 (Fruitland Township) | Receptor 128 (Southern Muscatine) | Receptor 130 (Central Muscatine) | Receptor 222 (City Hall) | Receptor 233 (Sweetland Center) |
|---|---|---|---|---|---|
| Point Sources | | | | | |
| Grain Processing Company | 9.4 | 46.2 | 50.0 | 9.0 | 1.3 |
| Farmers Grain Dealers | 1.0 | 10.8 | 2.0 | 1.2 | 0.1 |
| Central Soya #2 | 0.0 | 0.0 | 0.1 | 3.5 | 0.0 |
| Central Soya #2 | 0.4 | 1.3 | 14.8 | 0.9 | 0.1 |
| Muscatine Power and Water | 0.2 | 0.0 | 0.2 | 0.4 | 0.1 |
| Kent Feeds | 0.3 | 1.0 | 2.2 | 0.4 | 0.0 |
| Monsanto | 0.8 | 0.6 | 0.5 | 0.3 | 0.0 |
| Bandag #2 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 |
| Bandag #5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Eastern Iowa Light & Power (Montpeleir) | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| Area Sources | 6.8 | 8.9 | 13.1 | 14.1 | 3.9 |
| Background | 44.0 | 44.0 | 44.0 | 44.0 | 44.0 |
| Total Concentration | 63.0 | 113.1 | 127.0 | 73.5 | 49.6 |

Summary

Using the AQDM results, Muscatine is projeced to exceed the annual primary ambient air quality standard unless additional emission reduction is implemented.

A large area of southeastern Muscatine and a small area extending south of the city boundaries is projected to have annual arithmetic means in excess of 100 micrograms per cubic meter. An estimated breakdown of the annual suspended particulate concentrations using this model for Muscatine and a Muscatine County rural city, Sweetland Center, located in eastern Muscatine County is shown in Table 6. A graphical display of the estimated contributions by various suspended particulate source types is shown in Figure 9.

The largest sources of particulates shown in the table are from industrial sources and from transportation sources causing fugitive dust. The industrial sources located to the south account for about twenty percent of the total projected concentration in downtown Muscatine. Even with required control equipment, the industrial contribution remains relatively high in Muscatine. Some fluctuations in annual averages may occur when excessive breakdown or maintenance of air pollution control equipment occurs.

The second largest source of particulates shown in Table 6 is transportation oriented sources causing fugitive dust. These fugitive dust emissions are estimated to contribute nearly twenty percent of the total calculated particulate concentration while the emissions from the transportation source itself (i.e., from engine exhaust and tire wear) accounts for only four percent. As would be expected, the largest amount of fugitive dust is from paved roads in the urban area and from unpaved in the rural areas.

TABLE 6

Breakdown of Annual Suspended Particulate Concentration for Two Selected Sites in Muscatine

| Sources of Particulate | Expected Concentrations ($ug/m^3$) | |
|---|---|---|
| | Muscatine | Sweetland Center |
| Point Sources (Industrial Process) | 15.4 | 1.7 |
| Area Sources | | |
| Fuel use (Residential and Commercial) | 0.94 | 0.0 |
| Solid Waste Disposal (Open Burning) | 1.41 | 0.01 |
| Transportation | | |
| Exhaust, Tire Wear | 0.95 | 0.08 |
| Fugitive Dust from Paved Roads | 7.88 | 0.76 |
| Fugitive Dust from Unpaved Roads | 0.98 | 3.05 |
| Miscellaneous (structural fire, construction) | 1.94 | 0.0 |
| Background | 44.0 | 44.0 |
| TOTAL | 73.5 | 49.6 |

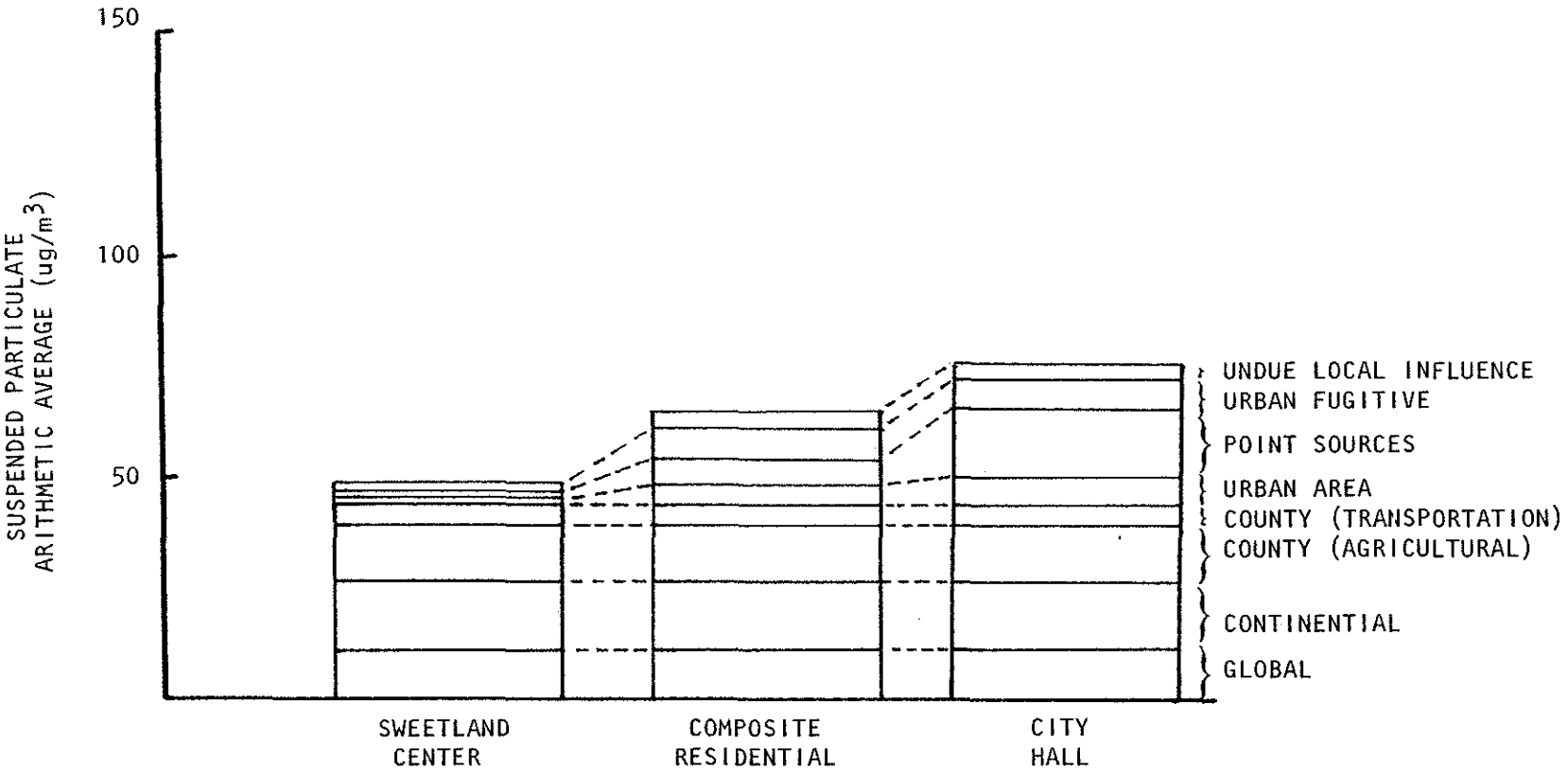



Figure 9. Estimated contributions of various suspended particulate source types

## References


1. GCA/Technology Division, "Assessment of particulate Attainment and Maintenance Problem", Volume 1 and 4, DEQ Contract No. 76-2000-06, September, 1976.

2. Air Quality Display Model prepared for Department of Health Education and Welfare Public Health Service by TRW Systems Group, November 1969, Contract No. PH-22-68-60.

3. "Official Iowa Population Projections, 1975-2020", Iowa Office of Planning and Programming, Series I-76, No. 1, July, 1976.

4. AP-42, "Compilation of Air Pollutant Emission Factors, Second Edition", U.S. Environmental Protection Agency, Research Triangle Park, North Carolina, February 1976.

5. Amick, R. S., Axetell, K., and Wells, D. M., "Fugitive Dust Emissions Inventory Techniques", Presented at the 67th Annual APCA meeting, #74-58, Page 7.

6. Cowherd, C. Jr., and Mann, C. O., "Quantification of Dust Entrainment from Paved Roads", Presented at the 69th Annual APCA meeting, #76-5.4, Page 13.

7. Iowa Airport System Plan, 1972, Department of Transportaton, Table 41.

# Appendix A

Muscatine Sources and Corresponding
Source Numbers

| Source Number | Source |
|---|---|
| 1-60, 99 | Grain Processing Company |
| 61-63 | Farmers Grain Dealers |
| 64 | Central Soya #1 |
| 65 | Central Soya #2 |
| 66-69 | Muscatine Power & Water |
| 70-73 | Kent Feed |
| 74-75 | Eastern Iowa Light & Power, Montpelier |
| 76-93 | Monsanto |
| 94-95 | Bandag #2 |
| 96-98 | Bandag #5 |
| 100-130 | Area Sources |

MUSCATINE, IOWA 1978 PROJECTED PARTICULATE CONC. MARCH, 1977

SOURCE DATA

| SOURCE NUMBER | SOURCE LOCATION (KILOMETERS) HORIZONTAL | VERTICAL | SOURCE AREA SQUARE KILOMETERS | ANNUAL SOURCE EMISSION RATE (TONS/DAY) SO2 | PART | STACK DATA HT (M) | DIAM (M) | VEL (M/SEC) | TEMP (DEG.K) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 662.2 | 4584.8 | 0.0 | 0.0 | 0.670 | 56.4 | 3.6 | 4.6 | 477. |
| 2 | 662.2 | 4584.8 | 0.0 | 0.0 | 0.244 | 30.5 | 1.8 | 8.2 | 491. |
| 3 | 662.2 | 4584.8 | 0.0 | 0.0 | 0.437 | 27.4 | 1.8 | 8.2 | 491. |
| 4 | 662.2 | 4584.8 | 0.0 | 0.0 | 1.090 | 34.1 | 1.8 | 18.9 | 505. |
| 5 | 662.2 | 4584.8 | 0.0 | 0.0 | 0.600 | 38.1 | 1.8 | 17.0 | 477. |
| 6 | 662.2 | 4584.8 | 0.0 | 0.0 | 0.009 | 36.4 | 0.5 | 15.5 | 294. |
| 7 | 662.2 | 4584.8 | 0.0 | 0.0 | 0.019 | 36.4 | 0.5 | 21.3 | 294. |
| 8 | 662.2 | 4584.8 | 0.0 | 0.0 | 0.024 | 7.7 | 0.7 | 9.1 | 294. |
| 9 | 662.2 | 4584.8 | 0.0 | 0.0 | 0.007 | 13.1 | 0.6 | 8.8 | 294. |
| 10 | 662.2 | 4584.8 | 0.0 | 0.0 | 0.006 | 7.0 | 0.5 | 21.6 | 294. |
| 11 | 662.2 | 4584.8 | 0.0 | 0.0 | 0.019 | 6.4 | 0.4 | 22.2 | 294. |
| 12 | 662.2 | 4584.6 | 0.0 | 0.0 | 0.325 | 8.5 | 0.8 | 9.1 | 321. |
| 13 | 662.2 | 4584.6 | 0.0 | 0.0 | 0.149 | 7.6 | 0.9 | 14.6 | 349. |
| 14 | 662.2 | 4584.6 | 0.0 | 0.0 | 0.247 | 12.8 | 0.6 | 21.3 | 294. |
| 15 | 662.2 | 4584.8 | 0.0 | 0.0 | 0.086 | 8.2 | 0.5 | 11.0 | 332. |
| 16 | 662.2 | 4584.8 | 0.0 | 0.0 | 0.008 | 11.5 | 0.5 | 9.1 | 326. |
| 17 | 662.1 | 4584.8 | 0.0 | 0.0 | 0.104 | 18.8 | 0.8 | 3.9 | 301. |
| 18 | 662.1 | 4584.8 | 0.0 | 0.0 | 0.137 | 11.8 | 1.2 | 15.8 | 344. |
| 19 | 662.2 | 4584.8 | 0.0 | 0.0 | 0.009 | 8.2 | 0.5 | 19.4 | 316. |
| 20 | 662.2 | 4584.8 | 0.0 | 0.0 | 0.015 | 15.5 | 0.6 | 11.8 | 294. |
| 21 | 662.1 | 4584.8 | 0.0 | 0.0 | 0.279 | 13.3 | 1.1 | 18.8 | 362. |
| 22 | 662.2 | 4584.8 | 0.0 | 0.0 | 0.007 | 11.8 | 0.6 | 9.1 | 294. |
| 23 | 662.2 | 4584.6 | 0.0 | 0.0 | 0.011 | 20.0 | 0.6 | 6.7 | 294. |
| 24 | 662.1 | 4584.8 | 0.0 | 0.0 | 0.031 | 13.3 | 0.9 | 21.5 | 327. |
| 25 | 662.1 | 4584.8 | 0.0 | 0.0 | 0.029 | 11.8 | 0.5 | 9.4 | 294. |
| 26 | 662.2 | 4584.6 | 0.0 | 0.0 | 0.081 | 13.0 | 0.6 | 21.2 | 300. |
| 27 | 662.2 | 4584.6 | 0.0 | 0.0 | 0.020 | 8.2 | 0.5 | 22.6 | 294. |
| 28 | 662.1 | 4584.8 | 0.0 | 0.0 | 0.082 | 23.6 | 0.4 | 21.8 | 394. |
| 29 | 662.1 | 4584.8 | 0.0 | 0.0 | 0.035 | 23.6 | 0.4 | 20.0 | 394. |
| 30 | 662.1 | 4584.8 | 0.0 | 0.0 | 0.060 | 23.6 | 0.4 | 22.1 | 394. |
| 31 | 662.1 | 4584.8 | 0.0 | 0.0 | 0.063 | 23.6 | 0.4 | 23.3 | 394. |
| 32 | 662.1 | 4584.8 | 0.0 | 0.0 | 0.110 | 25.8 | 1.4 | 13.0 | 336. |
| 33 | 662.1 | 4584.8 | 0.0 | 0.0 | 0.012 | 15.2 | 0.5 | 20.9 | 294. |
| 34 | 662.1 | 4584.8 | 0.0 | 0.0 | 0.008 | 27.3 | 0.6 | 11.5 | 294. |
| 35 | 662.2 | 4584.6 | 0.0 | 0.0 | 0.157 | 13.0 | 0.6 | 21.2 | 300. |
| 36 | 662.2 | 4584.6 | 0.0 | 0.0 | 0.135 | 13.0 | 0.6 | 21.2 | 300. |
| 37 | 662.2 | 4584.6 | 0.0 | 0.0 | 0.009 | 6.0 | 0.5 | 0.0 | 294. |
| 38 | 662.1 | 4584.8 | 0.0 | 0.0 | 0.015 | 6.0 | 0.5 | 0.0 | 300. |
| 39 | 662.2 | 4584.8 | 0.0 | 0.0 | 0.024 | 6.0 | 0.5 | 0.0 | 294. |
| 40 | 662.2 | 4584.6 | 0.0 | 0.0 | 0.110 | 6.0 | 0.5 | 0.0 | 300. |
| 41 | 662.1 | 4584.8 | 0.0 | 0.0 | 0.021 | 25.2 | 1.1 | 22.4 | 366. |
| 42 | 662.1 | 4584.8 | 0.0 | 0.0 | 0.010 | 23.3 | 0.9 | 14.5 | 327. |
| 43 | 662.1 | 4584.8 | 0.0 | 0.0 | 0.009 | 12.2 | 0.3 | 17.3 | 294. |
| 44 | 662.1 | 4584.8 | 0.0 | 0.0 | 0.051 | 24.4 | 1.2 | 3.1 | 355. |
| 45 | 662.1 | 4584.8 | 0.0 | 0.0 | 0.007 | 15.2 | 0.6 | 19.9 | 316. |
| 46 | 662.1 | 4584.8 | 0.0 | 0.0 | 0.007 | 15.2 | 0.6 | 20.1 | 316. |
| 47 | 662.1 | 4584.8 | 0.0 | 0.0 | 0.006 | 15.2 | 0.6 | 20.9 | 616. |
| 48 | 662.1 | 4584.8 | 0.0 | 0.0 | 0.024 | 15.2 | 0.6 | 21.3 | 616. |
| 49 | 662.1 | 4584.8 | 0.0 | 0.0 | 0.035 | 15.2 | 0.6 | 19.9 | 616. |
| 50 | 662.1 | 4584.8 | 0.0 | 0.0 | 0.027 | 15.2 | 0.6 | 15.3 | 616. |
| 51 | 662.1 | 4584.6 | 0.0 | 0.0 | 0.077 | 13.4 | 0.7 | 13.0 | 330. |
| 52 | 662.1 | 4584.6 | 0.0 | 0.0 | 0.017 | 9.1 | 0.9 | 18.2 | 350. |
| 53 | 662.2 | 4584.6 | 0.0 | 0.0 | 0.100 | 13.1 | 0.6 | 18.7 | 330. |
| 54 | 662.2 | 4584.6 | 0.0 | 0.0 | 0.015 | 9.1 | 0.9 | 19.8 | 322. |
| 55 | 662.2 | 4584.6 | 0.0 | 0.0 | 0.012 | 22.9 | 0.3 | 20.0 | 314. |
| 56 | 662.2 | 4584.8 | 0.0 | 0.0 | 0.214 | 3.0 | 0.0 | 0.0 | 294. |
| 57 | 662.2 | 4584.8 | 0.0 | 0.0 | 0.227 | 1.9 | 0.0 | 0.0 | 294. |
| 58 | 662.2 | 4584.8 | 0.0 | 0.0 | 0.077 | 2.0 | 0.0 | 0.0 | 294. |
| 59 | 662.1 | 4584.8 | 0.0 | 0.0 | 0.395 | 6.0 | 0.0 | 0.0 | 294. |
| 60 | 662.1 | 4584.8 | 0.0 | 0.0 | 0.197 | 20.0 | 0.0 | 0.0 | 294. |
| 61 | 662.5 | 4584.1 | 0.0 | 0.0 | 0.010 | 12.8 | 1.1 | 11.6 | 294. |
| 62 | 662.5 | 4584.1 | 0.0 | 0.0 | 0.076 | 6.0 | 0.0 | 0.0 | 294. |
| 63 | 662.6 | 4584.1 | 0.0 | 0.0 | 0.383 | 6.0 | 0.0 | 0.0 | 294. |
| 64 | 663.3 | 4586.9 | 0.0 | 0.0 | 0.019 | 6.0 | 0.0 | 0.0 | 294. |
| 65 | 662.2 | 4585.7 | 0.0 | 0.0 | 0.299 | 6.0 | 0.0 | 0.0 | 294. |
| 66 | 662.6 | 4583.9 | 0.0 | 0.0 | 0.092 | 67.1 | 2.7 | 7.0 | 386. |
| 67 | 662.6 | 4583.9 | 0.0 | 0.0 | 0.106 | 67.1 | 2.7 | 7.2 | 437. |
| 68 | 662.6 | 4583.9 | 0.0 | 0.0 | 0.146 | 67.1 | 2.7 | 8.7 | 386. |
| 69 | 662.6 | 4583.9 | 0.0 | 0.0 | 2.391 | 66.7 | 2.6 | 17.3 | 431. |
| 70 | 662.1 | 4585.0 | 0.0 | 0.0 | 0.019 | 9.1 | 0.5 | 27.9 | 294. |
| 71 | 662.1 | 4585.0 | 0.0 | 0.0 | 0.064 | 12.1 | 0.5 | 16.1 | 294. |
| 72 | 662.1 | 4585.0 | 0.0 | 0.0 | 0.012 | 7.3 | 0.5 | 13.1 | 294. |
| 73 | 662.1 | 4585.0 | 0.0 | 0.0 | 0.009 | 12.1 | 0.4 | 25.2 | 294. |
| 74 | 661.8 | 4591.6 | 0.0 | 0.0 | 0.890 | 49.7 | 1.6 | 14.2 | 433. |
| 75 | 661.8 | 4591.6 | 0.0 | 0.0 | 0.465 | 49.7 | 2.3 | 15.8 | 430. |

MUSCATINE, IOWA 1977 PROJECTED PARTICULATE CONC. MARCH, 1977

SOURCE DATA

| SOURCE NUMBER | SOURCE LOCATION (KILOMETERS) HORIZONTAL | VERTICAL | SOURCE AREA SQUARE KILOMETERS | ANNUAL SOURCE EMISSION RATE (TONS/DAY) SO2 | PART | STACK DATA HT (M) | DIAM (M) | VEL (M/SEC) | TEMP (DEG.K) |
|---|---|---|---|---|---|---|---|---|---|
| 76 | 660.7 | 4579.2 | 0.0 | 0.0 | 0.008 | 12.4 | 1.1 | 6.4 | 477. |
| 77 | 660.7 | 4579.2 | 0.0 | 0.0 | C.008 | 24.2 | 1.2 | 3.3 | 394. |
| 78 | 660.7 | 4579.2 | C.0 | 0.0 | C.026 | 24.2 | 1.4 | 12.7 | 469. |
| 79 | 660.7 | 4579.2 | 0.0 | 0.0 | C.014 | 22.7 | 0.9 | 3.6 | 373. |
| 80 | 660.7 | 4579.2 | C.0 | 0.0 | C.041 | 15.2 | 0.9 | 1.5 | 1144. |
| 81 | 660.7 | 4579.2 | 0.0 | 0.0 | 0.115 | 18.8 | 1.1 | 19.1 | 306. |
| 82 | 660.7 | 4579.2 | C.0 | 0.0 | C.013 | 13.6 | 0.5 | 5.7 | 353. |
| 83 | 660.7 | 4579.2 | C.0 | 0.0 | C.017 | 10.6 | 0.7 | 6.1 | 361. |
| 84 | 660.7 | 4579.2 | 0.0 | 0.0 | 0.006 | 9.1 | 0.7 | 1.6 | 353. |
| 85 | 660.7 | 4579.2 | C.0 | 0.0 | C.005 | 22.0 | 0.7 | 0.2 | 339. |
| 86 | 660.7 | 4579.2 | 0.0 | 0.0 | 0.013 | 27.4 | 0.8 | 0.6 | 339. |
| 87 | 660.7 | 4579.2 | C.0 | 0.0 | C.012 | 22.0 | 0.7 | 0.5 | 339. |
| 88 | 660.7 | 4579.2 | C.C | 0.0 | C.010 | 27.4 | 0.8 | 0.2 | 339. |
| 89 | 660.7 | 4579.2 | 0.0 | 0.0 | C.005 | 27.4 | 0.5 | 0.2 | 339. |
| 90 | 660.7 | 4579.2 | C.0 | 0.0 | C.018 | 21.3 | 0.5 | 2.0 | 294. |
| 91 | 660.7 | 4579.2 | 0.0 | 0.0 | C.012 | 8.5 | 0.7 | 2.0 | 294. |
| 92 | 660.7 | 4579.2 | C.0 | 0.0 | C.216 | 21.3 | 0.9 | 11.0 | 323. |
| 93 | 660.7 | 4579.2 | 0.0 | 0.0 | C.007 | 2.4 | 0.3 | 0.6 | 339. |
| 94 | 658.3 | 4586.4 | C.0 | 0.0 | C.055 | 9.1 | 0.8 | 7.3 | 309. |
| 95 | 658.3 | 4586.4 | C.0 | 0.0 | C.022 | 9.1 | 0.5 | 27.3 | 314. |
| 96 | 656.6 | 4581.5 | C.0 | 0.0 | C.011 | 9.1 | 0.3 | 10.6 | 306. |
| 97 | 656.6 | 4581.5 | C.0 | 0.0 | 0.022 | 9.1 | 0.5 | 27.3 | 314. |
| 98 | 656.6 | 4581.5 | C.0 | 0.0 | C.006 | 9.1 | 0.5 | 18.2 | 305. |
| 99 | 662.0 | 4584.6 | C.10 | 0.0 | C.323 | 0.0 | 0.0 | C.0 | 0. |
| 100 | 654.0 | 4589.0 | 36.00 | 0.0 | 1.510 | 3.0 | 0.0 | 0.0 | 0. |
| 101 | 660.0 | 4589.0 | 16.00 | C.0 | C.430 | 3.0 | 0.0 | C.0 | C. |
| 102 | 666.0 | 4589.0 | 16.00 | 0.0 | 0.757 | 3.0 | 0.0 | 0.0 | 0. |
| 103 | 654.0 | 4583.0 | 36.00 | 0.0 | 1.592 | 3.0 | 0.0 | C.0 | 0. |
| 104 | 660.0 | 4587.0 | 4.00 | 0.0 | 0.170 | 3.0 | 0.0 | 0.0 | 0. |
| 105 | 662.0 | 4588.0 | 1.00 | C.0 | C.123 | 3.0 | 0.0 | C.0 | 0. |
| 106 | 663.0 | 4588.0 | 1.00 | C.0 | C.077 | 3.0 | 0.0 | C.0 | 0. |
| 107 | 662.0 | 4587.0 | 1.00 | 0.0 | C.076 | 3.0 | 0.0 | C.0 | 0. |
| 108 | 663.0 | 4587.0 | 1.00 | C.0 | C.368 | 3.0 | 0.0 | C.0 | 0. |
| 109 | 664.0 | 4586.0 | 9.00 | 0.0 | 0.338 | 3.0 | 0.0 | 0.0 | 0. |
| 110 | 660.0 | 4585.0 | 4.00 | 0.0 | C.322 | 3.0 | 0.0 | C.0 | 0. |
| 111 | 662.0 | 4585.0 | 4.00 | C.0 | C.275 | 3.0 | 0.0 | C.0 | 0. |
| 112 | 660.0 | 4583.0 | 4.00 | C.0 | C.234 | 3.0 | 0.0 | C.0 | 0. |
| 113 | 662.0 | 4583.0 | 4.00 | 0.0 | C.085 | 3.0 | 0.0 | 0.0 | 0. |
| 114 | 664.0 | 4583.0 | 9.00 | 0.0 | C.395 | 3.0 | 0.0 | C.0 | 0. |
| 115 | 654.0 | 4577.0 | 36.00 | 0.0 | 2.359 | 3.0 | 0.0 | C.0 | 0. |
| 116 | 660.0 | 4577.0 | 36.00 | 0.0 | C.507 | 3.0 | 0.0 | C.0 | 0. |
| 117 | 636.0 | 4591.0 | 100.00 | C.0 | 1.069 | 3.0 | 0.0 | C.0 | 0. |
| 118 | 646.0 | 4594.0 | 81.00 | 0.0 | C.676 | 3.0 | 0.0 | C.0 | 0. |
| 119 | 654.0 | 4593.0 | 196.00 | C.0 | 1.787 | 3.0 | 0.0 | C.0 | 0. |
| 120 | 668.0 | 4600.0 | 49.00 | 0.0 | 0.695 | 3.0 | 0.0 | C.0 | 0. |
| 121 | 675.0 | 4597.0 | 100.00 | 0.0 | 1.345 | 3.0 | 0.0 | C.0 | 0. |
| 122 | 654.0 | 4600.0 | 49.00 | 0.0 | C.641 | 3.0 | 0.0 | 0.0 | 0. |
| 123 | 636.0 | 4587.0 | 100.00 | C.0 | C.826 | 3.0 | 0.0 | C.0 | 0. |
| 124 | 646.0 | 4585.0 | 81.00 | 0.0 | 0.491 | 3.0 | 0.0 | C.0 | 0. |
| 125 | 667.0 | 4586.0 | 64.00 | 0.0 | C.278 | 3.0 | 0.0 | C.0 | 0. |
| 126 | 675.0 | 4587.0 | 100.00 | C.0 | C.836 | 3.0 | 0.0 | C.0 | C. |
| 127 | 636.0 | 4577.0 | 100.00 | C.0 | C.769 | 3.0 | 0.0 | 0.0 | 0. |
| 128 | 646.0 | 4577.0 | 81.00 | 0.0 | C.727 | 3.0 | 0.0 | C.0 | C. |
| 129 | 666.0 | 4577.0 | 81.00 | 0.0 | 0.842 | 3.0 | 0.0 | 0.0 | 0. |
| 130 | 675.0 | 4577.0 | 100.00 | C.0 | 1.298 | 3.0 | 0.0 | 0.0 | 0. |

# Appendix B

RECEPTOR CONCENTRATION DATA

| RECEPTOR NUMBER | RECEPTOR LOCATION (KILOMETERS) HORIZ | VERT | EXPECTED ARITHMETIC MEAN (MICROGRAMS/CU. METER) SO2 | PARTICULATES |
|---|---|---|---|---|
| 1 | 655.0 | 4576.0 | 0. | 51. |
| 2 | 655.0 | 4577.0 | 0. | 52. |
| 3 | 655.0 | 4578.0 | 0. | 52. |
| 4 | 655.0 | 4579.0 | 0. | 52. |
| 5 | 655.0 | 4580.0 | 0. | 52. |
| 6 | 655.0 | 4581.0 | 0. | 52. |
| 7 | 655.0 | 4582.0 | 0. | 53. |
| 8 | 655.0 | 4583.0 | 0. | 53. |
| 9 | 655.0 | 4584.0 | 0. | 54. |
| 10 | 655.0 | 4585.0 | 0. | 54. |
| 11 | 655.0 | 4586.0 | 0. | 54. |
| 12 | 655.0 | 4587.0 | 0. | 54. |
| 13 | 655.0 | 4588.0 | 0. | 54. |
| 14 | 655.0 | 4589.0 | 0. | 54. |
| 15 | 655.0 | 4590.0 | 0. | 54. |
| 16 | 655.0 | 4591.0 | 0. | 53. |
| 17 | 655.0 | 4592.0 | 0. | 52. |
| 18 | 656.0 | 4576.0 | 0. | 51. |
| 19 | 656.0 | 4577.0 | 0. | 52. |
| 20 | 656.0 | 4578.0 | 0. | 52. |
| 21 | 656.0 | 4579.0 | 0. | 52. |
| 22 | 656.0 | 4580.0 | 0. | 52. |
| 23 | 656.0 | 4581.0 | 0. | 53. |
| 24 | 656.0 | 4582.0 | 0. | 53. |
| 25 | 656.0 | 4583.0 | 0. | 54. |
| 26 | 656.0 | 4584.0 | 0. | 54. |
| 27 | 656.0 | 4585.0 | 0. | 55. |
| 28 | 656.0 | 4586.0 | 0. | 55. |
| 29 | 656.0 | 4587.0 | 0. | 55. |
| 30 | 656.0 | 4588.0 | 0. | 55. |
| 31 | 656.0 | 4589.0 | 0. | 54. |
| 32 | 656.0 | 4590.0 | 0. | 54. |
| 33 | 656.0 | 4591.0 | 0. | 53. |
| 34 | 656.0 | 4592.0 | 0. | 52. |
| 35 | 657.0 | 4576.0 | 0. | 51. |
| 36 | 657.0 | 4577.0 | 0. | 52. |
| 37 | 657.0 | 4578.0 | 0. | 52. |
| 38 | 657.0 | 4579.0 | 0. | 52. |
| 39 | 657.0 | 4580.0 | 0. | 53. |
| 40 | 657.0 | 4581.0 | 0. | 54. |
| 41 | 657.0 | 4582.0 | 0. | 54. |
| 42 | 657.0 | 4583.0 | 0. | 54. |
| 43 | 657.0 | 4584.0 | 0. | 55. |
| 44 | 657.0 | 4585.0 | 0. | 55. |
| 45 | 657.0 | 4586.0 | 0. | 56. |
| 46 | 657.0 | 4587.0 | 0. | 56. |
| 47 | 657.0 | 4588.0 | 0. | 55. |
| 48 | 657.0 | 4589.0 | 0. | 55. |
| 49 | 657.0 | 4590.0 | 0. | 54. |
| 50 | 657.0 | 4591.0 | 0. | 53. |
| 51 | 657.0 | 4592.0 | 0. | 53. |
| 52 | 658.0 | 4576.0 | 0. | 50. |
| 53 | 658.0 | 4577.0 | 0. | 51. |
| 54 | 658.0 | 4578.0 | 0. | 51. |
| 55 | 658.0 | 4579.0 | 0. | 52. |
| 56 | 658.0 | 4580.0 | 0. | 53. |
| 57 | 658.0 | 4581.0 | 0. | 54. |
| 58 | 658.0 | 4582.0 | 0. | 54. |
| 59 | 658.0 | 4583.0 | 0. | 54. |
| 60 | 658.0 | 4584.0 | 0. | 55. |
| 61 | 658.0 | 4585.0 | 0. | 57. |
| 62 | 658.0 | 4586.0 | 0. | 58. |
| 63 | 658.0 | 4587.0 | 0. | 57. |
| 64 | 658.0 | 4588.0 | 0. | 56. |
| 65 | 658.0 | 4589.0 | 0. | 55. |
| 66 | 658.0 | 4590.0 | 0. | 54. |
| 67 | 658.0 | 4591.0 | 0. | 53. |
| 68 | 658.0 | 4592.0 | 0. | 53. |
| 69 | 659.0 | 4576.0 | 0. | 51. |
| 70 | 659.0 | 4577.0 | 0. | 51. |
| 71 | 659.0 | 4578.0 | 0. | 52. |
| 72 | 659.0 | 4579.0 | 0. | 53. |
| 73 | 659.0 | 4580.0 | 0. | 54. |
| 74 | 659.0 | 4581.0 | 0. | 54. |
| 75 | 659.0 | 4582.0 | 0. | 55. |
| 76 | 659.0 | 4583.0 | 0. | 56. |
| 77 | 659.0 | 4584.0 | 0. | 57. |
| 78 | 659.0 | 4585.0 | 0. | 61. |
| 79 | 659.0 | 4586.0 | 0. | 60. |
| 80 | 659.0 | 4587.0 | 0. | 59. |

RECEPTOR CONCENTRATION DATA

| RECEPTOR NUMBER | RECEPTOR LOCATION (KILOMETERS) | | EXPECTED ARITHMETIC MEAN (MICROGRAMS/CU. METER) | |
|---|---|---|---|---|
| | HORIZ | VERT | SO2 | PARTICULATES |
| 81 | 659.0 | 4588.0 | 0. | 57. |
| 82 | 659.0 | 4589.0 | 0. | 56. |
| 83 | 659.0 | 4590.0 | 0. | 55. |
| 84 | 659.0 | 4591.0 | 0. | 54. |
| 85 | 659.0 | 4592.0 | 0. | 53. |
| 86 | 660.0 | 4576.0 | 0. | 52. |
| 87 | 660.0 | 4577.0 | 0. | 52. |
| 88 | 660.0 | 4578.0 | 0. | 53. |
| 89 | 660.0 | 4579.0 | 0. | 55. |
| 90 | 660.0 | 4580.0 | 0. | 55. |
| 91 | 660.0 | 4581.0 | 0. | 55. |
| 92 | 660.0 | 4582.0 | 0. | 57. |
| 93 | 660.0 | 4583.0 | 0. | 60. |
| 94 | 660.0 | 4584.0 | 0. | 63. |
| 95 | 660.0 | 4585.0 | 0. | 68. |
| 96 | 660.0 | 4586.0 | 0. | 66. |
| 97 | 660.0 | 4587.0 | 0. | 62. |
| 98 | 660.0 | 4588.0 | 0. | 59. |
| 99 | 660.0 | 4589.0 | 0. | 57. |
| 100 | 660.0 | 4590.0 | 0. | 56. |
| 101 | 660.0 | 4591.0 | 0. | 55. |
| 102 | 660.0 | 4592.0 | 0. | 55. |
| 103 | 661.0 | 4576.0 | 0. | 52. |
| 104 | 661.0 | 4577.0 | 0. | 53. |
| 105 | 661.0 | 4578.0 | 0. | 55. |
| 106 | 661.0 | 4579.0 | 0. | 61. |
| 107 | 661.0 | 4580.0 | 0. | 58. |
| 108 | 661.0 | 4581.0 | 0. | 57. |
| 109 | 661.0 | 4582.0 | 0. | 58. |
| 110 | 661.0 | 4583.0 | 0. | 63. |
| 111 | 661.0 | 4584.0 | 0. | 71. |
| 112 | 661.0 | 4585.0 | 0. | 87. |
| 113 | 661.0 | 4586.0 | 0. | 71. |
| 114 | 661.0 | 4587.0 | 0. | 64. |
| 115 | 661.0 | 4588.0 | 0. | 61. |
| 116 | 661.0 | 4589.0 | 0. | 61. |
| 117 | 661.0 | 4590.0 | 0. | 59. |
| 118 | 661.0 | 4591.0 | 0. | 58. |
| 119 | 661.0 | 4592.0 | 0. | 57. |
| 120 | 662.0 | 4576.0 | 0. | 53. |
| 121 | 662.0 | 4577.0 | 0. | 54. |
| 122 | 662.0 | 4578.0 | 0. | 56. |
| 123 | 662.0 | 4579.0 | 0. | 57. |
| 124 | 662.0 | 4580.0 | 0. | 57. |
| 125 | 662.0 | 4581.0 | 0. | 59. |
| 126 | 662.0 | 4582.0 | 0. | 63. |
| 127 | 662.0 | 4583.0 | 0. | 73. |
| 128 | 662.0 | 4584.0 | 0. | 113. |
| 129 | 662.0 | 4585.0 | 0. | 229. |
| 130 | 662.0 | 4586.0 | 0. | 127. |
| 131 | 662.0 | 4587.0 | 0. | 88. |
| 132 | 662.0 | 4588.0 | 0. | 77. |
| 133 | 662.0 | 4589.0 | 0. | 68. |
| 134 | 662.0 | 4590.0 | 0. | 63. |
| 135 | 662.0 | 4591.0 | 0. | 61. |
| 136 | 662.0 | 4592.0 | 0. | 59. |
| 137 | 663.0 | 4576.0 | 0. | 53. |
| 138 | 663.0 | 4577.0 | 0. | 54. |
| 139 | 663.0 | 4578.0 | 0. | 55. |
| 140 | 663.0 | 4579.0 | 0. | 56. |
| 141 | 663.0 | 4580.0 | 0. | 56. |
| 142 | 663.0 | 4581.0 | 0. | 58. |
| 143 | 663.0 | 4582.0 | 0. | 62. |
| 144 | 663.0 | 4583.0 | 0. | 70. |
| 145 | 663.0 | 4584.0 | 0. | 125. |
| 146 | 663.0 | 4585.0 | 0. | 97. |
| 147 | 663.0 | 4586.0 | 0. | 82. |
| 148 | 663.0 | 4587.0 | 0. | 84. |
| 149 | 663.0 | 4588.0 | 0. | 72. |
| 150 | 663.0 | 4589.0 | 0. | 66. |
| 151 | 663.0 | 4590.0 | 0. | 62. |
| 152 | 663.0 | 4591.0 | 0. | 60. |
| 153 | 663.0 | 4592.0 | 0. | 58. |
| 154 | 664.0 | 4576.0 | 0. | 52. |
| 155 | 664.0 | 4577.0 | 0. | 53. |
| 156 | 664.0 | 4578.0 | 0. | 54. |
| 157 | 664.0 | 4579.0 | 0. | 54. |
| 158 | 664.0 | 4580.0 | 0. | 55. |
| 159 | 664.0 | 4581.0 | 0. | 56. |
| 160 | 664.0 | 4582.0 | 0. | 61. |

RECEPTOR CONCENTRATION DATA

| RECEPTOR NUMBER | RECEPTOR LOCATION (KILOMETERS) HORIZ | VERT | EXPECTED ARITHMETIC MEAN (MICROGRAMS/CU. METER) SO2 | PARTICULATES |
|---|---|---|---|---|
| 161 | 664.0 | 4583.0 | 0. | 69. |
| 162 | 664.0 | 4584.0 | 0. | 74. |
| 163 | 664.0 | 4585.0 | 0. | 69. |
| 164 | 664.0 | 4586.0 | 0. | 66. |
| 165 | 664.0 | 4587.0 | 0. | 64. |
| 166 | 664.0 | 4588.0 | 0. | 62. |
| 167 | 664.0 | 4589.0 | 0. | 60. |
| 168 | 664.0 | 4590.0 | 0. | 58. |
| 169 | 664.0 | 4591.0 | 0. | 57. |
| 170 | 664.0 | 4592.0 | 0. | 56. |
| 171 | 665.0 | 4576.0 | 0. | 52. |
| 172 | 665.0 | 4577.0 | 0. | 52. |
| 173 | 665.0 | 4578.0 | 0. | 53. |
| 174 | 665.0 | 4579.0 | 0. | 54. |
| 175 | 665.0 | 4580.0 | 0. | 55. |
| 176 | 665.0 | 4581.0 | 0. | 57. |
| 177 | 665.0 | 4582.0 | 0. | 60. |
| 178 | 665.0 | 4583.0 | 0. | 63. |
| 179 | 665.0 | 4584.0 | 0. | 63. |
| 180 | 665.0 | 4585.0 | 0. | 61. |
| 181 | 665.0 | 4586.0 | 0. | 59. |
| 182 | 665.0 | 4587.0 | 0. | 58. |
| 183 | 665.0 | 4588.0 | 0. | 57. |
| 184 | 665.0 | 4589.0 | 0. | 57. |
| 185 | 665.0 | 4590.0 | 0. | 56. |
| 186 | 665.0 | 4591.0 | 0. | 54. |
| 187 | 665.0 | 4592.0 | 0. | 54. |
| 188 | 666.0 | 4576.0 | 0. | 51. |
| 189 | 666.0 | 4577.0 | 0. | 52. |
| 190 | 666.0 | 4578.0 | 0. | 53. |
| 191 | 666.0 | 4579.0 | 0. | 54. |
| 192 | 666.0 | 4580.0 | 0. | 55. |
| 193 | 666.0 | 4581.0 | 0. | 56. |
| 194 | 666.0 | 4582.0 | 0. | 58. |
| 195 | 666.0 | 4583.0 | 0. | 58. |
| 196 | 666.0 | 4584.0 | 0. | 58. |
| 197 | 666.0 | 4585.0 | 0. | 57. |
| 198 | 666.0 | 4586.0 | 0. | 55. |
| 199 | 666.0 | 4587.0 | 0. | 55. |
| 200 | 666.0 | 4588.0 | 0. | 54. |
| 201 | 666.0 | 4589.0 | 0. | 54. |
| 202 | 666.0 | 4590.0 | 0. | 54. |
| 203 | 666.0 | 4591.0 | 0. | 53. |
| 204 | 666.0 | 4592.0 | 0. | 52. |
| 205 | 667.0 | 4576.0 | 0. | 51. |
| 206 | 667.0 | 4577.0 | 0. | 52. |
| 207 | 667.0 | 4578.0 | 0. | 53. |
| 208 | 667.0 | 4579.0 | 0. | 54. |
| 209 | 667.0 | 4580.0 | 0. | 55. |
| 210 | 667.0 | 4581.0 | 0. | 55. |
| 211 | 667.0 | 4582.0 | 0. | 56. |
| 212 | 667.0 | 4583.0 | 0. | 56. |
| 213 | 667.0 | 4584.0 | 0. | 56. |
| 214 | 667.0 | 4585.0 | 0. | 55. |
| 215 | 667.0 | 4586.0 | 0. | 54. |
| 216 | 667.0 | 4587.0 | 0. | 53. |
| 217 | 667.0 | 4588.0 | 0. | 53. |
| 218 | 667.0 | 4589.0 | 0. | 52. |
| 219 | 667.0 | 4590.0 | 0. | 52. |
| 220 | 667.0 | 4591.0 | 0. | 52. |
| 221 | 667.0 | 4592.0 | 0. | 52. |
| 222 | 663.4 | 4587.3 | 0. | 74. |
| 223 | 661.9 | 4586.4 | 0. | 93. |
| 224 | 661.5 | 4584.9 | 0. | 122. |
| 225 | 656.5 | 4579.3 | 0. | 52. |
| 226 | 645.0 | 4582.0 | 0. | 49. |
| 227 | 645.6 | 4593.9 | 0. | 49. |
| 228 | 644.8 | 4603.5 | 0. | 48. |
| 229 | 660.0 | 4604.0 | 0. | 51. |
| 230 | 654.0 | 4589.0 | 0. | 54. |
| 231 | 679.4 | 4606.2 | 0. | 47. |
| 232 | 680.4 | 4594.0 | 0. | 47. |
| 233 | 669.7 | 4595.3 | 0. | 50. |

Muscatine Sources and Corresponding
Source Numbers

| Source Number | Source |
|---|---|
| 1-60, 99 | Grain Processing Company |
| 61-63 | Farmers Grain Dealers |
| 64 | Central Soya #1 |
| 65 | Central Soya #2 |
| 66-69 | Muscatine Power & Water |
| 70-73 | Kent Feed |
| 74-75 | Eastern Iowa Light & Power, Montpelier |
| 76-93 | Monsanto |
| 94-95 | Bandag #2 |
| 96-98 | Bandag #5 |
| 100-130 | Area Sources |

MUSCATINE, IOWA 1976 PROJECTED PARTICULATE CONC. MARCH, 1977

SOURCE CONTRIBUTIONS TO FIVE SELECTED RECEPTORS

ANNUAL PARTICULATES

MICROGRAMS PER CUBIC METER

| SOURCE | RECEPTOR 126 | RECEPTOR 128 | RECEPTOR 130 | RECEPTOR 222 | RECEPTOR 233 |
|---|---|---|---|---|---|
| 1 | 0.15 % | 0.01 % | C.07 % | 0.15 % | 0.07 % |
| | 0.0946 | 0.0125 | 0.0859 | 0.1130 | 0.0358 |
| 2 | 0.23 % | 0.06 % | C.21 % | 0.22 % | 0.05 % |
| | 0.1446 | 0.0698 | 0.2636 | 0.1643 | 0.0256 |
| 3 | 0.43 % | 0.13 % | C.42 % | 0.42 % | 0.09 % |
| | 0.2697 | 0.1477 | 0.5217 | 0.3060 | 0.0462 |
| 4 | 0.35 % | 0.03 % | 0.18 % | 0.34 % | 0.13 % |
| | 0.2194 | 0.0371 | 0.2322 | 0.2533 | 0.0628 |
| 5 | 0.21 % | 0.02 % | 0.12 % | 0.21 % | 0.07 % |
| | 0.1315 | 0.0253 | 0.1476 | 0.1508 | 0.0357 |
| 6 | 0.03 % | 0.04 % | C.06 % | 0.02 % | 0.00 % |
| | 0.0166 | 0.0413 | 0.0756 | 0.0178 | 0.0022 |
| 7 | 0.06 % | 0.07 % | C.12 % | 0.05 % | 0.01 % |
| | 0.0348 | 0.0821 | 0.1537 | 0.0372 | 0.0047 |
| 8 | 0.08 % | 0.24 % | C.26 % | 0.07 % | 0.01 % |
| | 0.0499 | 0.2703 | 0.3319 | 0.0532 | 0.0060 |
| 9 | 0.02 % | 0.07 % | C.07 % | 0.02 % | 0.00 % |
| | 0.0144 | 0.0735 | C.0932 | 0.0154 | 0.0017 |
| 10 | 0.02 % | 0.06 % | C.07 % | 0.02 % | 0.00 % |
| | 0.0125 | 0.0670 | C.0826 | 0.0133 | 0.0015 |
| 11 | 0.06 % | 0.20 % | 0.21 % | 0.06 % | 0.01 % |
| | 0.0396 | 0.2223 | C.2683 | 0.0423 | 0.0047 |
| 12 | 1.14 % | 2.66 % | 2.46 % | 0.86 % | 0.16 % |
| | 0.7164 | 3.0051 | 3.1264 | 0.6310 | 0.0806 |
| 13 | 0.39 % | 0.73 % | C.84 % | 0.30 % | 0.05 % |
| | 0.2451 | 0.8271 | 1.0683 | 0.2234 | 0.0269 |
| 14 | 0.89 % | 2.29 % | 2.03 % | 0.66 % | 0.12 % |
| | 0.5625 | 2.5852 | 2.5829 | 0.4863 | 0.0613 |
| 15 | 0.28 % | 0.73 % | C.85 % | 0.25 % | 0.04 % |
| | 0.1749 | 0.8250 | 1.0816 | 0.1869 | 0.0214 |
| 16 | 0.03 % | 0.07 % | C.08 % | 0.02 % | 0.00 % |
| | 0.0162 | 0.0760 | 0.1005 | 0.0174 | 0.0020 |
| 17 | 0.35 % | 1.06 % | 1.19 % | 0.29 % | 0.05 % |
| | 0.2198 | 1.2025 | 1.5051 | 0.2140 | 0.0256 |
| 18 | 0.31 % | 0.91 % | C.77 % | 0.26 % | 0.05 % |
| | 0.1920 | 0.9729 | 0.9737 | 0.1945 | 0.0241 |
| 19 | 0.03 % | 0.07 % | C.09 % | 0.03 % | 0.00 % |
| | 0.0181 | 0.0820 | 0.1054 | 0.0154 | 0.0022 |
| 20 | 0.05 % | 0.13 % | C.15 % | 0.04 % | 0.01 % |
| | 0.0305 | 0.1445 | C.1905 | 0.0326 | 0.0037 |
| 21 | 0.59 % | 0.78 % | 1.30 % | 0.51 % | 0.10 % |
| | 0.3713 | 0.8865 | 1.6515 | 0.3760 | 0.0486 |
| 22 | 0.02 % | 0.07 % | 0.07 % | 0.02 % | 0.00 % |
| | 0.0145 | 0.0753 | 0.0944 | 0.0154 | 0.0017 |
| 23 | 0.04 % | 0.09 % | 0.09 % | 0.03 % | 0.01 % |
| | 0.0249 | 0.1072 | C.1135 | 0.0215 | 0.0027 |
| 24 | 0.07 % | 0.16 % | C.22 % | 0.06 % | 0.01 % |
| | 0.0466 | 0.1841 | 0.2768 | 0.0471 | 0.0055 |
| 25 | 0.10 % | 0.37 % | 0.37 % | 0.08 % | 0.01 % |
| | 0.0630 | 0.4192 | 0.4742 | 0.0612 | 0.0071 |
| 26 | 0.29 % | 0.66 % | C.63 % | 0.21 % | 0.04 % |
| | 0.1809 | 0.7461 | C.8028 | 0.1579 | 0.0201 |
| 27 | 0.07 % | 0.23 % | C.18 % | 0.05 % | 0.01 % |
| | 0.0466 | 0.2576 | C.2235 | 0.0399 | 0.0050 |
| 28 | 0.24 % | 0.43 % | 0.60 % | 0.21 % | 0.04 % |
| | 0.1540 | 0.4890 | 0.7671 | 0.1516 | 0.0200 |
| 29 | 0.11 % | 0.19 % | 0.26 % | 0.09 % | 0.02 % |
| | 0.0663 | 0.2157 | 0.3356 | 0.0652 | 0.0085 |
| 30 | 0.12 % | 0.21 % | C.29 % | 0.10 % | 0.02 % |
| | 0.0750 | 0.2373 | 0.3727 | 0.0739 | 0.0098 |
| 31 | 0.19 % | 0.32 % | C.46 % | 0.16 % | 0.03 % |
| | 0.1175 | 0.2660 | 0.5779 | 0.1157 | 0.0154 |
| 32 | 0.22 % | 0.21 % | 0.41 % | 0.19 % | 0.04 % |
| | 0.1390 | 0.2331 | C.5240 | 0.1410 | 0.0191 |
| 33 | 0.04 % | 0.13 % | C.14 % | 0.03 % | 0.01 % |
| | 0.0256 | 0.1486 | 0.1804 | 0.0249 | 0.0030 |
| 34 | 0.03 % | C.06 % | C.08 % | 0.02 % | 0.00 % |
| | 0.0163 | C.0694 | C.0993 | 0.0159 | 0.0020 |
| 35 | 0.56 % | 1.28 % | 1.23 % | 0.42 % | 0.08 % |
| | 0.3507 | 1.4461 | 1.5561 | 0.3061 | 0.0389 |
| 36 | 0.48 % | 1.09 % | 1.05 % | 0.36 % | 0.07 % |
| | 0.2993 | 1.2343 | 1.3281 | 0.2613 | 0.0332 |
| 37 | 0.03 % | 0.13 % | 0.08 % | 0.02 % | 0.00 % |
| | 0.0214 | 0.1435 | 0.1071 | 0.0182 | 0.0022 |
| 38 | 0.05 % | 0.22 % | C.21 % | 0.04 % | 0.01 % |
| | 0.0331 | 0.2482 | C.2632 | 0.0321 | 0.0037 |
| 39 | 0.08 % | 0.27 % | C.28 % | 0.07 % | 0.01 % |
| | 0.0505 | 0.3020 | 0.3523 | 0.0538 | 0.0060 |
| 40 | 0.42 % | 1.55 % | 1.03 % | 0.30 % | 0.06 % |
| | 0.2619 | 1.7541 | 1.3087 | 0.2221 | 0.0274 |
| 41 | 0.04 % | 0.02 % | C.06 % | 0.03 % | 0.01 % |
| | 0.0239 | 0.0278 | 0.0710 | 0.0243 | 0.0036 |
| 42 | 0.02 % | 0.03 % | C.05 % | 0.02 % | 0.00 % |
| | 0.0136 | 0.0321 | 0.0624 | 0.0138 | 0.0018 |

MUSCATINE, IOWA 1976 PROJECTED PARTICULATE CONC. MARCH, 1977

SOURCE CONTRIBUTIONS TO FIVE SELECTED RECEPTORS

ANNUAL PARTICULATES

MICROGRAMS PER CUBIC METER

| SOURCE | RECEPTOR 126 | RECEPTOR 128 | RECEPTOR 130 | RECEPTOR 222 | RECEPTOR 233 |
|---|---|---|---|---|---|
| 43 | 0.03 % | 0.12 % | 0.12 % | 0.03 % | 0.00 % |
| | 0.0196 | 0.1319 | 0.1482 | 0.0190 | 0.0022 |
| 44 | 0.15 % | 0.27 % | 0.38 % | 0.13 % | 0.03 % |
| | 0.0962 | 0.3042 | 0.4800 | 0.0946 | 0.0124 |
| 45 | 0.02 % | 0.06 % | 0.07 % | 0.02 % | 0.00 % |
| | 0.0141 | 0.0625 | 0.0844 | 0.0138 | 0.0017 |
| 46 | 0.02 % | 0.06 % | 0.07 % | 0.02 % | 0.00 % |
| | 0.0141 | 0.0623 | 0.0842 | 0.0138 | 0.0017 |
| 47 | 0.01 % | 0.02 % | 0.03 % | 0.01 % | 0.00 % |
| | 0.0082 | 0.0211 | 0.0385 | 0.0083 | 0.0011 |
| 48 | 0.05 % | 0.07 % | 0.12 % | 0.04 % | 0.01 % |
| | 0.0326 | 0.0829 | 0.1520 | 0.0330 | 0.0042 |
| 49 | 0.08 % | 0.11 % | 0.18 % | 0.07 % | 0.01 % |
| | 0.0482 | 0.1289 | 0.2315 | 0.0488 | 0.0061 |
| 50 | 0.06 % | 0.11 % | 0.16 % | 0.05 % | 0.01 % |
| | 0.0388 | 0.1242 | 0.2066 | 0.0393 | 0.0048 |
| 51 | 0.27 % | 0.75 % | 0.60 % | 0.19 % | 0.04 % |
| | 0.1701 | 0.8500 | 0.7578 | 0.1402 | 0.0188 |
| 52 | 0.05 % | 0.10 % | 0.10 % | 0.03 % | 0.01 % |
| | 0.0284 | 0.1166 | 0.1298 | 0.0239 | 0.0030 |
| 53 | 0.33 % | 0.61 % | 0.66 % | 0.26 % | 0.05 % |
| | 0.2083 | 0.6911 | 0.8389 | 0.1882 | 0.0247 |
| 54 | 0.04 % | 0.08 % | 0.09 % | 0.03 % | 0.01 % |
| | 0.0249 | 0.0863 | 0.1052 | 0.0226 | 0.0027 |
| 55 | 0.04 % | 0.08 % | 0.09 % | 0.03 % | 0.01 % |
| | 0.0264 | 0.0902 | 0.1140 | 0.0231 | 0.0030 |
| 56 | 0.72 % | 2.42 % | 2.50 % | 0.65 % | 0.11 % |
| | 0.4511 | 2.7378 | 3.1651 | 0.4807 | 0.0535 |
| 57 | 0.76 % | 2.58 % | 2.66 % | 0.69 % | 0.11 % |
| | 0.4788 | 2.9184 | 3.3705 | 0.5102 | 0.0567 |
| 58 | 0.26 % | 0.87 % | 0.90 % | 0.24 % | 0.04 % |
| | 0.1624 | 0.9881 | 1.1421 | 0.1730 | 0.0192 |
| 59 | 1.38 % | 5.78 % | 5.46 % | 1.15 % | 0.20 % |
| | 0.8714 | 6.5350 | 6.9318 | 0.8464 | 0.0974 |
| 60 | 0.67 % | 2.30 % | 2.42 % | 0.56 % | 0.10 % |
| | 0.4224 | 2.5997 | 3.0666 | 0.4106 | 0.0484 |
| 61 | 0.04 % | 0.12 % | 0.04 % | 0.03 % | 0.01 % |
| | 0.0222 | 0.1321 | 0.0449 | 0.0226 | 0.0025 |
| 62 | 0.30 % | 1.97 % | 0.31 % | 0.24 % | 0.04 % |
| | 0.1894 | 2.2238 | 0.3907 | 0.1753 | 0.0193 |
| 63 | 1.32 % | 7.56 % | 1.26 % | 1.30 % | 0.20 % |
| | 0.8337 | 8.5462 | 1.5977 | 0.9568 | 0.0985 |
| 64 | 0.02 % | 0.01 % | 0.05 % | 2.39 % | 0.01 % |
| | 0.0118 | 0.0150 | 0.0675 | 1.7586 | 0.0058 |
| 65 | 0.65 % | 1.19 % | 13.97 % | 1.35 % | 0.15 % |
| | 0.4095 | 1.3455 | 17.7297 | 0.9924 | 0.0754 |
| 66 | 0.02 % | 0.00 % | 0.02 % | 0.04 % | 0.01 % |
| | 0.0103 | 0.0027 | 0.0202 | 0.0302 | 0.0057 |
| 67 | 0.01 % | 0.00 % | 0.01 % | 0.04 % | 0.01 % |
| | 0.0083 | 0.0019 | 0.0164 | 0.0270 | 0.0060 |
| 68 | 0.02 % | 0.00 % | 0.02 % | 0.05 % | 0.02 % |
| | 0.0128 | 0.0031 | 0.0253 | 0.0403 | 0.0085 |
| 69 | 0.12 % | 0.01 % | 0.12 % | 0.41 % | 0.20 % |
| | 0.0766 | 0.0158 | 0.1536 | 0.3009 | 0.1008 |
| 70 | 0.06 % | 0.17 % | 0.31 % | 0.06 % | 0.01 % |
| | 0.0364 | 0.1911 | 0.3910 | 0.0436 | 0.0047 |
| 71 | 0.19 % | 0.57 % | 1.04 % | 0.20 % | 0.03 % |
| | 0.1225 | 0.6487 | 1.3250 | 0.1471 | 0.0158 |
| 72 | 0.04 % | 0.12 % | 0.21 % | 0.04 % | 0.01 % |
| | 0.0232 | 0.1310 | 0.2674 | 0.0280 | 0.0030 |
| 73 | 0.03 % | 0.08 % | 0.15 % | 0.03 % | 0.00 % |
| | 0.0172 | 0.0912 | 0.1863 | 0.0207 | 0.0022 |
| 74 | 0.03 % | 0.02 % | 0.02 % | 0.03 % | 0.11 % |
| | 0.0168 | 0.0172 | 0.0215 | 0.0257 | 0.0545 |
| 75 | 0.01 % | 0.01 % | 0.01 % | 0.01 % | 0.04 % |
| | 0.0072 | 0.0074 | 0.0091 | 0.0107 | 0.0212 |
| 76 | 0.02 % | 0.01 % | 0.00 % | 0.00 % | 0.00 % |
| | 0.0105 | 0.0081 | 0.0062 | 0.0035 | 0.0010 |
| 77 | 0.02 % | 0.01 % | 0.00 % | 0.00 % | 0.00 % |
| | 0.0107 | 0.0082 | 0.0063 | 0.0035 | 0.0010 |
| 78 | 0.03 % | 0.01 % | 0.01 % | 0.01 % | 0.00 % |
| | 0.0186 | 0.0155 | 0.0120 | 0.0069 | 0.0020 |
| 79 | 0.04 % | 0.02 % | 0.01 % | 0.01 % | 0.01 % |
| | 0.0241 | 0.0188 | 0.0147 | 0.0083 | 0.0026 |
| 80 | 0.11 % | 0.05 % | 0.03 % | 0.03 % | 0.02 % |
| | 0.0714 | 0.0556 | 0.0431 | 0.0242 | 0.0075 |
| 81 | 0.25 % | 0.10 % | 0.07 % | 0.07 % | 0.03 % |
| | 0.1557 | 0.1183 | 0.0902 | 0.0503 | 0.0149 |
| 82 | 0.04 % | 0.02 % | 0.01 % | 0.01 % | 0.00 % |
| | 0.0235 | 0.0179 | 0.0138 | 0.0077 | 0.0024 |
| 83 | 0.05 % | 0.02 % | 0.01 % | 0.01 % | 0.01 % |
| | 0.0304 | 0.0233 | 0.0180 | 0.0101 | 0.0031 |
| 84 | 0.02 % | 0.01 % | 0.01 % | 0.00 % | 0.00 % |
| | 0.0110 | 0.0083 | 0.0064 | 0.0036 | 0.0011 |

MUSCATINE, IOWA 1976 PROJECTED PARTICULATE CONTR. MARCH, 1977

SOURCE CONTRIBUTIONS TO FIVE SELECTED RECEPTORS

ANNUAL PARTICULATES

MICROGRAMS PER CUBIC METER

| SOURCE | RECEPTOR 126 | RECEPTOR 128 | RECEPTOR 130 | RECEPTOR 222 | RECEPTOR 233 |
|---|---|---|---|---|---|
| 85 | 0.01 % | 0.01 % | C.00 % | 0.00 % | 0.00 % |
| | 0.0090 | 0.0068 | 0.0053 | 0.0030 | 0.0009 |
| 86 | 0.04 % | 0.02 % | C.01 % | 0.01 % | 0.00 % |
| | 0.0229 | 0.0177 | 0.0137 | 0.0077 | 0.0024 |
| 87 | 0.03 % | 0.01 % | C.01 % | 0.01 % | 0.00 % |
| | 0.0215 | 0.0164 | 0.0127 | 0.0071 | 0.0022 |
| 88 | 0.03 % | 0.01 % | 0.01 % | 0.01 % | 0.00 % |
| | 0.0177 | 0.0136 | 0.0105 | 0.0059 | 0.0018 |
| 89 | 0.01 % | 0.01 % | 0.00 % | 0.00 % | 0.00 % |
| | 0.0089 | 0.0068 | 0.0053 | 0.0030 | 0.0009 |
| 90 | 0.05 % | 0.02 % | 0.02 % | 0.01 % | 0.01 % |
| | 0.0324 | 0.0247 | 0.0191 | 0.0107 | 0.0033 |
| 91 | 0.04 % | 0.01 % | 0.01 % | 0.01 % | 0.00 % |
| | 0.0221 | 0.0166 | 0.0128 | 0.0072 | 0.0022 |
| 92 | 0.58 % | 0.26 % | C.18 % | 0.17 % | 0.08 % |
| | 0.3650 | 0.2891 | 0.2254 | 0.1270 | 0.0393 |
| 93 | 0.02 % | 0.01 % | 0.01 % | 0.01 % | 0.00 % |
| | 0.0129 | 0.0097 | 0.0075 | 0.0042 | 0.0013 |
| 94 | 0.08 % | 0.07 % | 0.06 % | 0.05 % | 0.02 % |
| | 0.0496 | 0.0747 | 0.0723 | 0.0374 | 0.0093 |
| 95 | 0.03 % | C.03 % | C.02 % | 0.02 % | 0.01 % |
| | 0.0198 | 0.0297 | 0.0287 | 0.0149 | 0.0037 |
| 96 | 0.01 % | 0.00 % | C.00 % | 0.00 % | 0.00 % |
| | 0.0076 | 0.0047 | 0.0045 | 0.0033 | 0.0014 |
| 97 | 0.02 % | 0.01 % | C.01 % | 0.01 % | 0.01 % |
| | 0.0151 | 0.0094 | 0.0085 | 0.0066 | 0.0027 |
| 98 | 0.01 % | 0.00 % | 0.00 % | 0.00 % | 0.00 % |
| | 0.0041 | 0.0026 | 0.0024 | 0.0018 | 0.0007 |
| 99 | 1.21 % | 6.86 % | 3.37 % | 0.74 % | 0.16 % |
| | 0.7619 | 7.7532 | 4.2821 | 0.5419 | 0.0786 |
| 100 | 0.80 % | 0.46 % | 0.44 % | 0.64 % | 0.47 % |
| | 0.5016 | 0.5210 | 0.5571 | 0.4705 | 0.2339 |
| 101 | 0.30 % | 0.22 % | C.26 % | 0.42 % | 0.20 % |
| | 0.1887 | 0.2538 | 0.3324 | 0.3075 | 0.1000 |
| 102 | 0.41 % | 0.28 % | C.33 % | 1.73 % | 0.56 % |
| | 0.2600 | 0.3213 | 0.4137 | 1.2742 | 0.2763 |
| 103 | 0.87 % | C.44 % | C.35 % | 0.51 % | 0.39 % |
| | 0.5464 | 0.4927 | 0.4456 | 0.3764 | 0.1930 |
| 104 | 0.23 % | 0.18 % | 0.24 % | 0.24 % | 0.07 % |
| | 0.1434 | 0.2058 | 0.3055 | 0.1794 | 0.0351 |
| 105 | 0.15 % | 0.13 % | C.24 % | 0.73 % | 0.07 % |
| | 0.0934 | 0.1498 | 0.3081 | 0.5354 | 0.0335 |
| 106 | 0.07 % | 0.06 % | C.10 % | 0.76 % | 0.05 % |
| | 0.0414 | 0.0649 | 0.1300 | 0.5573 | 0.0243 |
| 107 | 0.11 % | 0.11 % | 0.36 % | 0.43 % | 0.04 % |
| | 0.0715 | 0.1281 | C.4616 | 0.3182 | 0.0201 |
| 108 | 0.37 % | 0.40 % | 1.01 % | 8.97 % | 0.22 % |
| | 0.2341 | 0.4528 | 1.2788 | 6.5964 | 0.1076 |
| 109 | 0.30 % | 0.22 % | 0.27 % | 1.26 % | 0.24 % |
| | 0.1870 | 0.2473 | 0.3403 | 0.9270 | 0.1168 |
| 110 | 0.62 % | 0.52 % | 0.41 % | 0.34 % | 0.14 % |
| | 0.3898 | 0.5862 | C.5243 | 0.2507 | 0.0686 |
| 111 | 0.53 % | 1.14 % | 1.22 % | 0.62 % | 0.13 % |
| | 0.3339 | 1.2934 | 1.5451 | 0.4552 | 0.0637 |
| 112 | 0.68 % | 0.34 % | 0.23 % | 0.23 % | 0.09 % |
| | 0.4260 | 0.3810 | 0.2860 | 0.1693 | 0.0428 |
| 113 | 0.64 % | C.42 % | 0.13 % | 0.15 % | 0.04 % |
| | 0.3998 | C.4776 | C.1652 | 0.1098 | 0.0182 |
| 114 | 0.39 % | 0.28 % | 0.32 % | 0.57 % | 0.27 % |
| | 0.2445 | 0.3202 | 0.4120 | 0.4192 | 0.1362 |
| 115 | 0.91 % | 0.51 % | 0.45 % | 0.64 % | 0.54 % |
| | 0.5704 | C.5778 | C.5650 | 0.4713 | 0.2697 |
| 116 | 0.40 % | 0.21 % | 0.17 % | 0.26 % | 0.20 % |
| | 0.2505 | 0.2398 | C.2125 | 0.1892 | 0.0970 |
| 117 | 0.22 % | C.15 % | C.12 % | 0.19 % | 0.21 % |
| | 0.1390 | 0.1652 | 0.1543 | 0.1434 | 0.1027 |
| 118 | 0.19 % | 0.11 % | C.10 % | 0.17 % | 0.17 % |
| | 0.1220 | 0.1259 | 0.1294 | 0.1260 | 0.0853 |
| 119 | 0.46 % | C.26 % | 0.24 % | 0.35 % | 0.48 % |
| | 0.2896 | C.2945 | C.2987 | 0.2599 | 0.2365 |
| 120 | 0.12 % | C.07 % | C.07 % | 0.13 % | 0.35 % |
| | 0.0759 | C.0798 | C.0855 | 0.0972 | 0.1721 |
| 121 | 0.20 % | 0.12 % | C.11 % | 0.21 % | 0.65 % |
| | 0.1243 | 0.1388 | C.1422 | 0.1570 | 0.3204 |
| 122 | 0.19 % | 0.11 % | 0.11 % | 0.20 % | 0.29 % |
| | 0.1171 | 0.1255 | C.1377 | 0.1454 | 0.1426 |
| 123 | 0.17 % | 0.09 % | 0.08 % | 0.13 % | 0.11 % |
| | 0.1090 | C.1035 | C.0985 | 0.0950 | 0.0564 |
| 124 | 0.14 % | C.08 % | C.06 % | 0.10 % | 0.09 % |
| | 0.0888 | 0.0867 | 0.0805 | 0.0707 | 0.0469 |
| 125 | 0.09 % | C.06 % | C.06 % | 0.22 % | 0.19 % |
| | 0.0576 | C.0705 | C.0767 | 0.1584 | 0.0923 |
| 126 | 0.18 % | 0.11 % | C.10 % | 0.20 % | 0.46 % |
| | 0.1156 | 0.1298 | 0.1329 | 0.1448 | 0.2263 |

MUSCATINE, IOWA 1976 PROJECTED PARTICULATE CONC. MARCH, 1977

SOURCE CONTRIBUTIONS TO FIVE SELECTED RECEPTORS

ANNUAL PARTICULATES

MICROGRAMS PER CUBIC METER

| SOURCE | RECEPTOR 126 | RECEPTOR 128 | RECEPTOR 130 | RECEPTOR 222 | RECEPTOR 233 |
|---|---|---|---|---|---|
| 127 | 0.13 % | 0.06 % | 0.05 % | 0.09 % | 0.09 % |
| | 0.0789 | 0.0730 | 0.0670 | 0.0642 | 0.0437 |
| 128 | 0.16 % | 0.08 % | 0.07 % | 0.11 % | 0.11 % |
| | 0.0997 | 0.0954 | 0.0885 | 0.0830 | 0.0551 |
| 129 | 0.34 % | 0.22 % | 0.19 % | 0.34 % | 0.39 % |
| | 0.2140 | 0.2435 | 0.2291 | 0.2489 | 0.1930 |
| 130 | 0.33 % | 0.18 % | 0.15 % | 0.30 % | 0.51 % |
| | 0.2087 | 0.1992 | 0.1924 | 0.2184 | 0.2521 |
| BACK-GROUND | 69.90 % | 38.93 % | 34.66 % | 59.81 % | 88.72 % |
| | 44. | 44. | 44. | 44. | 44. |
| TOTAL | 100.0 % | 100.0 % | 100.0 % | 100.0 % | 100.0 % |
| | 62.9619 | 113.0669 | 126.9878 | 73.5993 | 49.5944 |